FAA Safety BRIEFING

May/June 2011

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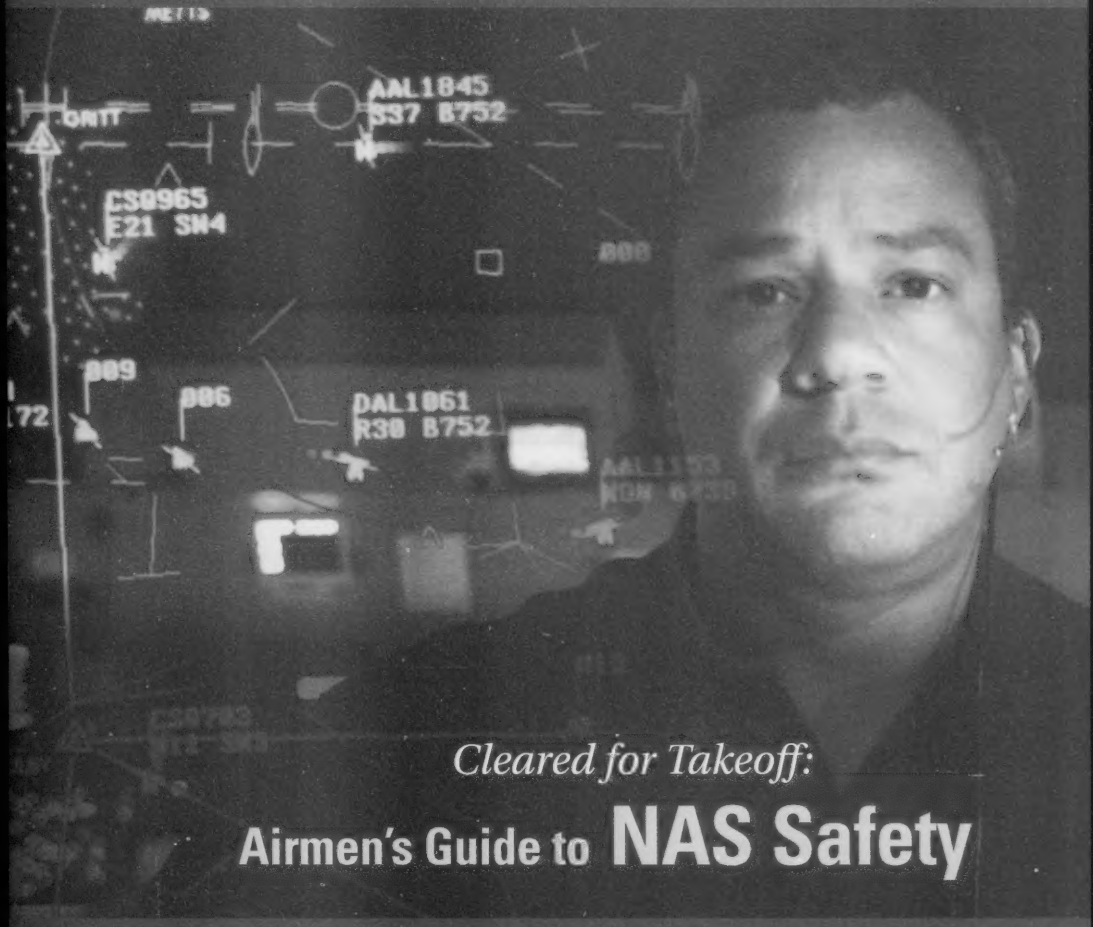

Cleared for Takeoff:

Airmen's Guide to NAS Safety

Federal Aviation Administration

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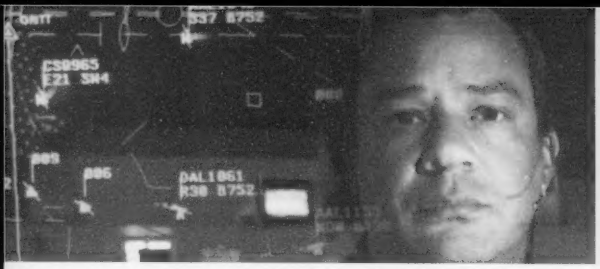

The May/June 2011 issue of FAA Safety Briefing *explores how developments in the National Airspace System affect and benefit general aviation pilots. Articles highlight some of the changes and challenges of flying in today's NAS, and provide tips pilots can use to meet those challenges safely and efficiently.*

Photo by Jon Ross

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JOHN ALLEN
DIRECTOR, FLIGHT STANDARDS SERVICE

Charting the New NAS

One of my favorite places in the world to get in touch with grass roots aviation is the airport in Cynthiana, Kentucky—my hometown. Part of what I love so much about Cynthiana-Harrison County Airport (K0I8) is how its down-home, small town hospitality creates such a welcoming way station for pilots weary of the complexity in modern aviation. In many ways, I think Cynthiana-Harrison embodies the perfect aviation world metaphor described in FAA Administrator Randy Babbitt's Destination 2025 vision for the future: Air traffic moves swiftly, efficiently, and seamlessly. Flights take off and land at will and with minimal delay. Aviation operations provide both direct and indirect benefits to the community.

Cynthiana Simplicity on a Global Scale

That's very nice, you say, but the overall aviation world is much more crowded and far more complicated than Cynthiana-Harrison. True. There will always be enormous differences between places like Cynthiana and Chicago. As implied in the Destination 2025 vision statement, though, part of the FAA's goal for the National Airspace System (NAS) in 2025 is to develop and deploy the complex systems that will, in effect, enable us to operate everywhere with an element of Cynthiana simplicity and efficiency.

The challenge is to develop systems that increase the safety, reliability, efficiency, and capacity of the entire NAS. This vision will require a full overhaul of skills, technology, equipment, and system oversight and management. So, how do we get there?

The path to this transformation is paved by the Next Generation Air Transportation System, or NextGen. NextGen is the term we have adopted to describe the series of inter-linked technologies, procedures, and policies that will enable us to transform the way we operate in the NAS. The next few years will be a pivotal time in the history of air transportation as the face of aviation is transformed around the world. Ultimately, the GPS-driven NextGen system will:

- Help us identify and eliminate safety risks before they evolve into incidents or accidents.
- Create a digital communications network that will let NAS users access and share the information they need quickly, clearly, and efficiently.
- Reduce delays by responding quickly to changes in the operating environment at a given location.
- Combine new technology with changes in the way we route aircraft to reduce aviation's environmental footprint.

NextGen is Here Now

Although it will obviously take time to develop the full NextGen system, it is important to know that you can play a part now by taking advantage of what is already available. The latest NextGen component with the most immediate benefit for pilots in places like my hometown is Automatic Dependent Surveillance–Broadcast, or ADS-B.

Although it will obviously take time to develop the entire NextGen system, it is important for pilots to know that some parts of it are already available.

We know ADS-B equipage can represent a substantial investment, but we hope pilots will choose to take advantage of this technology. It has already proven to be a great help to the GA community in Alaska and helicopter operators in the Gulf of Mexico, and its expansion will benefit the entire country.

As we continue the evolution of NextGen toward Destination 2025, we expect a safer and more efficient use of the NAS and better access to airports everywhere, from Chicago to Cynthiana-Harrison.

ATIS Aviation News Roundup

Twelve Controllers Awarded Archie League Medal of Safety

When you're talking about all-time leaders in saves, it's natural to think of baseball greats like Trevor Hoffman or Mariano Rivera. But any pilot who's ever been rattled by an inflight emergency that required an extra set of eyes and ears, and a reassuring voice from ATC, might have someone else in mind when considering the term save, someone like Derek Bittman perhaps. Bittman was among the 12 air traffic controllers chosen as this year's Archie League Medal of Safety Award recipients, a prestigious honor that recognizes controllers who go above and beyond the call of duty to assist pilots in distress. Bittman's outstanding job of safely assisting a pilot encountering equipment failures, low fuel, and fog also earned him the National Air Traffic Controllers Association (NATCA) President's Award, which recognizes the top "save" of 2010.

The Archie League Awards, named after the first air traffic controller in the United States, were presented Mar. 23, 2011, at the NATCA annual safety conference in Las Vegas, Nev. Attendees, and those watching a webcast of the event, were able to hear the gripping play-by-play of each controller's conversation with pilots who faced a variety of challenging events and situations, including engine failures, off-airport landings, and one controller who helped facilitate a water rescue of a capsized boater.

"Day in and day out our workforce goes to every length possible in the relentless pursuit of safety," said NATCA President Paul Rinaldi and Executive Vice President Trish Gilbert in a joint written statement, "and last year we continued the trend as 2010 proved one of exceptional service to the safety of the National Airspace System."

The 12 winners were chosen by a panel of judges comprised of NATCA Director of Safety and Technology Dale Wright, AOPA Air Safety Foundation President Bruce Landsberg, and Capt. Jeffrey Skiles, co-pilot of US Airways Flight 1549, which safely ditched in the Hudson River in 2009. A video archive of the award ceremony is available on NATCA's Web site: www.natca.org.

The 2011 recipients of the Archie League Medal of Safety Award.

New Tools for WINGS Program

The FAA Safety Team has released the long-awaited Advisory Circular (AC) on the WINGS Pilot Proficiency program (AC61-91J) available on www.faa.gov/regulations_policies/advisory_circulars/. This AC not only explains the program but reaffirms the ability of flight instructors to renew their flight instructor certificates by participating in WINGS.

Every flight instructor should have a copy of the AC in his or her flight bag so that questions posed by pilots about the WINGS Program can be answered authoritatively. Regarding

flight instructor renewal, the AC states that an instructor must:

1. Hold a flight instructor certificate that has not expired,
2. Hold a current phase of WINGS (at any level) at the time of application,
3. Have evaluated at least 15 WINGS-accredited flight activities (any level) during which the CFI evaluates at least five different pilots and makes appropriate endorsements in the logbook of each pilot for each activity,
4. Present a record to an aviation safety inspector showing that the CFI has met the requirements of subparagraph 6d(3) above within the preceding 24 calendar-months before the month of application for renewal of his or her flight instructor certificate, and
5. Present a completed FAA Form 8710-1, Airman Certificate and/or Rating Application Supplemental Information and Instructions, to an authorized person for renewal of his or her flight instructor certificate.

In addition to the AC, there is also a new WINGS User's Guide available on FAASafety.gov. The User's Guide includes several color screen shots that take you through the process of accessing the site and setting up your WINGS profile. Both the AC and User's Guide are available through links located on every pilot's individual My WINGS page on FAASafety.gov.

The objective of the WINGS program is to address the primary accident causal factors that continue to plague the GA community in such a manner as to suggest mitigation strategies to avoid those accidents. The program is based on the premise that pilots who maintain currency and proficiency in the basics of flight will enjoy a safer and more stress-free flying experience.

If you require additional assistance with the program, please do not hesitate to contact one of the many FAASTeam representatives in your area.

Cirrus Electrical Problem Prompts Issuance of SAIB

FAA issued Special Airworthiness Information Bulletin (SAIB) CE-08-12R1 to address an airworthiness concern for possible failure of a transient voltage suppressor (TVS) on Cirrus Design Corporation (CDC) Models SR20 and SR22. The SAIB, posted Mar. 16, 2011, was in response to several reports of TVS failures that lead to the loss of NAV/COM1 and created smoke and fume hazards in the cockpit. To date, no specific reason has been positively identified for the failures although several companies are working on the problem.

The FAA recommends the following:

1. All CDC airplane owner/operators should thoroughly read Cirrus' Sept. 11, 2007, service advisory, SA 07-17. The service advisory provides good information on what to expect should a TVS failure occur and what actions should be taken by the pilot.
2. Cirrus SR20 or SR22 owners should reference Service Bulletin SB 2X-24-09 to see if it applies to their airplane and incorporate the actions of the bulletin. Completion of the service bulletin will reduce or eliminate smoke in the cockpit in the event of a TVS failure.

You may obtain the service information referenced above at: www.cirruslink.com/mycirrus/servicepubs.aspx. You may read the SAIB at: www.faa.gov/aircraft/safety/alerts/SAIB/.

College Aviation Program Earns Top AMT Competition Prize

Pictured here are members of the Redstone College-sponsored teams that competed in AMTSociety's 2011 Maintenance Skills Competition (www.amtsociety.org/maintenance_skills_competition.jsp) held in Las Vegas, Nev. Both the student (red-and-black shirts) and general aviation teams (black shirts) from Redstone finished first in their respective categories at the event. Now in its fourth year, the Skills Competition has grown to 26 teams that compete against each other in 12 events ranging from safety wiring to electrical troubleshooting.

Happy Birthday Chuck!

Many people commemorate the start of summer on Memorial Day, but why not get started a week earlier by celebrating one of aviation's unsung heroes—Charles Edward Taylor? May 24 marks the birthday of this aviation legend whose ground-breaking work with the Wright Brothers earned him the title "father of aircraft maintenance." In recognition of Taylor's contributions, and those of the thousands of maintenance professionals who would follow in his footsteps, a movement was started to designate May 24 as National Aviation Maintenance Technician (AMT) Day. In 2008, the passing of a U.S. Congressional resolution made that a reality and AMT Day is now widely celebrated at FBOs, schools, and maintenance facilities across the country.

Photo courtesy of the U.S. Air Force

Charles Edward Taylor

Another great way to honor Taylor is by checking out the AMT Awards Program offered on www.faasafety.gov. Through this program, the FAA recognizes eligible technicians and employers by issuing awards to those who receive or promote and foster initial and recurrent training. The program has several levels, or phases, of recognition for both you and your employer. You can obtain an FAA Certificate of Training and an AMT Awards Program yearly decal upon successful completion of the program requirements. Employers can obtain a Gold or Diamond Award of Excellence yearly depending on the percentage of their employees receiving awards.

View Advisory Circular 65-25: Aviation Maintenance Technician Awards Program for more information.

If You Cross the Line, You've Crossed the Line

The numbers are in and they are not good! Pilot deviations are on the rise. While there has been a 75 percent drop over the past two years in serious runway incursions, categorized as A or B and defined as posing a significant risk of collision, total runway incursions are increasing. Approximately three runway incursions occur daily, two of which usually involve pilot error. And the preponderance of those errors are caused by general aviation pilots.

As a pilot, it is your responsibility to ensure safe operation of your aircraft at all times, so arm yourself with simple tools to help you stay off pilot deviation or accident reports.

- Pay careful attention to ATC taxi instructions, especially when told to hold short of active runways or when crossing taxiways. Don't forget, you will now hear "line up and wait" instead of "taxi into position and hold" when instructed to taxi onto the runway in preparation for takeoff.
- Write down your taxi clearances or use a digital recorder like the ones built into several intercom systems. If in doubt, ask for a progressive taxi or, at a minimum, ask for clarification.
- Review procedures for airport surface operations at your local airport and the airports you frequent. Review the runway signage and what they mean.
- Brush up on proper radio phraseology and practice clear and concise radio communication skills.

Remember, you are the final authority as to the operation of your aircraft. Don't take clearances as you "think" they were intended if there is any question about them. Speak up, get clarification, and stay safe.

FREDERICK E. TILTON, M.D.
FEDERAL AIR SURGEON

Aeromedical Advisory

Flying High: Do You Have What it Takes?

No, we're not talking about Top Gun or the Right Stuff-type flying skills. We're talking about air to breathe and, more specifically, oxygen.

You know the rules: a pilot must use supplemental oxygen when flying at 12,500 feet MSL for more than 30 minutes and continuously above 14,000 feet MSL. The point is to prevent hypoxia, which can incapacitate the pilot first by impairing judgment and perception of danger and eventually by rendering the individual unconscious (or worse).

Knowing these rules is sufficient to pass a knowledge test, but the real-life test requires a solid understanding of how to use supplemental oxygen equipment correctly, effectively, and safely.

Know Your O_2 Systems

There are three basic components to any oxygen system. One is the storage system, or O_2 container. In most cases, small GA aircraft use canisters or bottles to store oxygen as a gas. These can be filled at high pressure (1,800-2,200 psi) or low pressure (400-450 psi). Though economical and easy to install, storage canisters or bottles can be bulky and heavy.

The delivery system is the second component. There are many options available for use in light GA aircraft, but the continuous flow system is one of the most common and least expensive. It provides a constant flow of oxygen at a fixed rate and therefore does not require the regulators and masks used in other delivery systems, such as diluter demand and pressure demand. Pulse demand, a new oxygen delivery option for light aircraft, combines aspects of continuous flow and diluter demand systems, thus conserving the oxygen supply while maintaining a safe level of oxygenation in the blood.

Think of the final component, the nasal cannula or face mask, as the way an oxygen system interfaces with the human occupants. The nasal cannula consists of small tubes that fit into the nostrils. Pilots generally find the cannula to be more comfortable than masks, but it can only be used up to 18,000 feet MSL because it doesn't provide oxygen to the mouth.

The PRICE is Right

PRICE is a handy memory aid that every pilot who uses an oxygen system should know. It's an easy way to remember what items you need to check before using a supplemental oxygen system for aviation purposes.

- **P**ressure: be sure you have enough oxygen pressure and quantity
- **R**egulator: inspect the regulator or outlet assembly
- **I**ndicator: don the mask to verify that the flow indicator works
- **C**onnections: ensure all the connections are secured
- **E**mergency: be sure to have oxygen ready for both emergency and normal situations and brief passengers on proper use of on-board oxygen systems.

For more information, check out some of the resources below. Also, consider an aviation physiology course or training that includes instruction on the operation and use of supplemental oxygen systems.

Good health and safe flying!

Frederick E. Tilton, M.D., M.P.H., received both an M.S. and a M.D. degree from the University of New Mexico and an M.P.H. from the University of Texas. During a 26-year career with the U.S. Air Force, Dr. Tilton logged more than 4,000 hours as a command pilot and senior flight surgeon flying a variety of aircraft. He currently flies the Cessna Citation 560 XL.

For More Information

Oxygen Equipment: Use in General Aviation Operations
www.faa.gov/pilots/safety/pilotsafetybrochures/media/Oxygen_Equipment.pdf

Physiology of Flight Videos
www.faa.gov/pilots/training/airman_education/physiologyvideos/

Aerospace Physiology Training
www.faa.gov/pilots/training/airman_education/aerospace_physiology/

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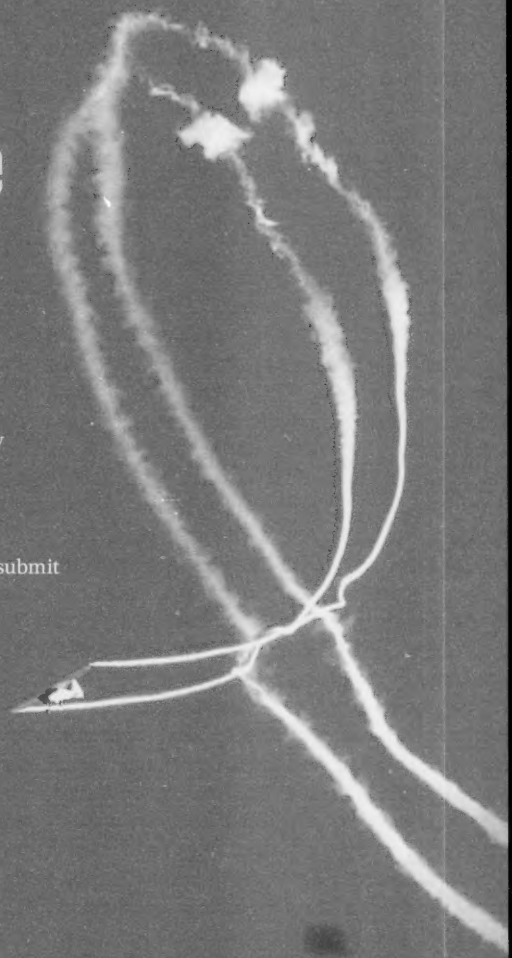
With this online option you can complete FAA Form 8500-8 in the privacy and comfort of your home and submit it before your appointment.

The service is free and can be found at:

https://medxpress.faa.gov/



DR. WARREN S. SILBERMAN

Ask Medical Certification

Dr. Warren S. Silberman and his staff administer the aeromedical certification program for about 600,000 holders of U.S. pilot certificates and process 450,000 medical certification applications each year.

Q: I have had a Special Issuance third-class medical since 1994 with annual renewals due to a triple bypass (without heart attack) in February 1994. I was diagnosed with acute promyelocytic leukemia in 2010. I am currently in remission and will begin a two-year maintenance regimen that will include ATRA (chemotherapy). Is it possible for me to get a Special Issuance third-class medical and what are the requirements?

A: I am happy you are currently in remission and hope you remain so! Here is a chart from our online Guide for Aviation Medical Examiners. For acute forms of leukemia, pilots may not fly until they have been in remission for two years and off chemotherapy medications for two years as well. Generally, the FAA does not permit airmen to fly while receiving chemotherapy agents.

Disease/Condition	Class	Evaluation Data	Disposition
Leukemia, Acute and Chronic – All Types	All	Submit a current status report and all pertinent medical reports	Requires FAA Decision

Q: I am a professional pilot and breast cancer survivor. As you can imagine, when a person hears the word cancer, one of the first things to come to mind is, "Oh, no, my flying career is over!" At the time of my diagnosis, I had many questions regarding my qualifications for the first-class medical certificate. I performed my own research and realized that there is really nothing available that addresses my concerns.

A: Congratulations that you are a survivor! The FAA's policy on breast cancer requests that airmen wait until whatever treatment they and their treating physicians decide upon has been completed and they are free from any side-effects before they request an Authorization for Special Issuance of a Medical Certificate (waiver) to resume flying. If the treating physician elects to treat the airman with what is known as adjuvant chemotherapy, or radiation, the airman is grounded until the therapy is completed. The airman can then return to flying duties if no aeromedically significant side-effects are present.

If the cancer has spread into the lymph glands, this will usually lead to surgery as well as chemotherapy. In this circumstance, the FAA also requests airmen not request a waiver until all of the treatments are completed and they are free from any side-effects. In these situations, the FAA requires the airman to have a scan of the brain as the cancer can spread there. This is because a seizure can be the initial manifestation and the MRI scan can discover spread of the cancer perhaps prior to the individual suffering such an event. Also, breast cancer that has spread to a lung or other areas will usually result in the airman being grounded for longer periods to see if the cancer will recur.

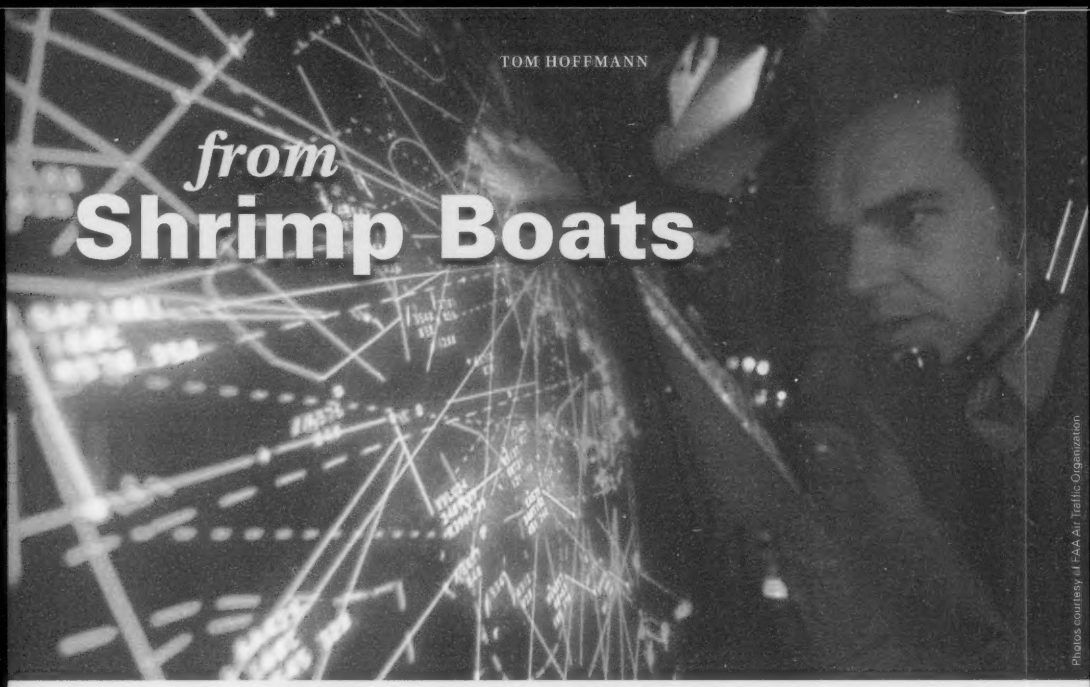
Send your question to SafetyBriefing@faa.gov. We will forward it to Dr. Silberman without your name and publish the answer in an upcoming issue.

Warren S. Silberman, D.O., M.P.H., manager of FAA's Aerospace Medical Certification Division, joined FAA in 1997 after a career in the U.S. Army Medical Corps. Dr. Silberman is Board Certified in Internal Medical and Preventive/Aerospace Medicine. A private pilot with instrument and multi-engine ratings, he holds a third-class medical certificate.

TOM HOFFMANN

from Shrimp Boats *to* Satellites

The Evolution of the National Airspace System



Photos courtesy of FAA Air Traffic Organization

Air traffic control technology is ever evolving to improve the safety of the National Airspace System. The shift from the monochromatic radar scopes of the last century (pictured above) to the full-color digital displays with multi-tiered weather information that controllers use today is only one example.

It's a sweltering summer afternoon in 1929 at St. Louis Lambert Field. Peering out from under the shade of a beach umbrella perched alongside the airport tarmac, mechanic and barnstormer pilot Archie League carefully scans the sky. While manning his makeshift control tower—*a wheelbarrow*—League patiently waits to direct aircraft to and fro with a pair of signal flags at the ready. It is hard to imagine, but in the late 1920s this crude operation represented the extent of air traffic control services.

League's efforts as a pioneer air traffic controller, while venerable, stand as a stark contrast to how aircraft are kept safely separated today. More than 80 years later, today's National Airspace System (NAS) is among the most complex in the world, supporting more than 60 million aircraft a year and more than 19,000 airports across the nation. At the heart of those operations are the 15,000-plus air traffic controllers who work in concert with a vast network of navigational equipment to keep our skies the safest they have ever been. That is no small accomplishment given the numerous changes the aviation industry has endured over the last century. As we look to embrace the safety-enhancing benefits of FAA's Next Generation Air Transportation System, or NextGen, there is much we can learn from previous generations whose innovative thinking enabled them to adapt to changing environments and affect safe change in the NAS.

Can You Hear Me Now?

According to airspace pioneer Glen Gilbert, air traffic control has one basic objective: to prevent a collision between two aircraft. That simple creed became increasingly difficult to uphold with the voluntary "see and be seen" policies in place during the boom of aviation in the early 1930s. Gilbert

was among the first to emphasize the need for not only a more structured system, but one that also mandated participation to remain effective. One of the limiting factors at this stage of the game was radio technology, which, as its popularity grew, eventually phased out the bonfires, signal flags, and light gun signals previously used as primary communication tools. Direct radio links also proved useful as they would later replace the cumbersome relay of one-way telephone and radio calls between pilot, dispatcher, and controller.

Further complicating the early days of ATC was the lack of engineering support from the U.S. Department of Commerce. This meant controllers had to be inventors as well as guardians of the sky. Among some of the early home-grown ideas that helped controllers perform their jobs included telephone recording equipment, flight sequencing boards, and the small wooden markers dubbed "shrimp boats" that were pushed around an airspace map every 15 minutes to keep track of aircraft positions.

Since the science of airspace management was literally starting from scratch, there was also a pressing need for system planning contributions. Earl Ward, regarded by many as the father of air traffic control, is credited with many of those innovations. Ward conceived the idea of establishing a system of Air Traffic Control Centers. The first three were located in Newark, Cleveland, and Chicago. These centers, along with the procedures Gilbert helped develop for the industry's first ATC manual, provided the building blocks for what was becoming a globally-recognized air traffic management system.

In the years that followed, aviation continued to grow, spurred by World War II efforts to build more airports and produce bigger, faster, and more advanced aircraft. While some may have questioned the ability of United States airspace to accommodate the anticipated gridlock of private, commercial, and military users, Gilbert maintained that an ATC system should not discriminate but permit access to *all* categories of airspace users. He dispelled the notion of what were considered "incurable limiting factors" in his book *Air Traffic Control: The Uncrowded Sky*. "It is the system that is crowded, not the skies," said Gilbert. "In other words, our objective must be to learn how to effectively utilize the virtually unlimited capacity of our Uncrowded Sky."

The advent of radar technology helped do just that, and, by the early 1950s, aircraft movements were visible on electronic scopes. Aided later by computers, ATC was soon able to follow those blips

Photo courtesy the National Air and Space Museum

J.V. Tighe (l), the controller who invented the "shrimp boats," and airspace pioneer Glen Gilbert in the Chicago Airway Traffic Control Center in 1936.

on more sophisticated three-dimensional tracks. In the following decades airspace safety made tremendous strides with enhancements in the areas of automation, weather, navigation, avionics equipment, and more. These improvements became effective tools in handling the growing volume and diversity of traffic and provided both ATC and pilots greater situational awareness, a key ingredient to a safe NAS.

Recalculating...

Gilbert had the right idea when he predicted the final challenges for a future generation of effective air traffic management would need to factor in the complete picture of all its individual elements. That means considering everything from the framework of regulations and procedures to the end-user pilots and controllers. Using the principles of integration and collaboration, the FAA's NextGen transition is based on this more holistic approach to airspace safety and represents an entirely new and forward-looking way of doing business.

Gilbert maintained that an ATC system should not discriminate but permit access to all categories of airspace users.

"NextGen is in some ways similar to the concept of putting a man on the moon," said FAA Deputy Administrator Michael Huerta at an Air Traffic Control Association conference last fall. "We know we can do it. We know we have the technology. And now we are working to design the sequence for the technology and the exact procedures we will use."

In 2011, the impact of NextGen is already visible with NAS users reaping some of its benefits. Setting the stage for today's capabilities were many accomplishments in recent years that focused

on the satellite-aided Automatic Dependent Surveillance–Broadcast (ADS-B) system. One of six transformational NextGen technologies, ADS-B transmits the location of aircraft to controllers and other ADS-B equipped aircraft with a faster update-rate than radar. Aircraft that are equipped with an ADS-B In multi-function display will receive free weather and traffic information. Pilots flying in properly equipped aircraft in ADS-B coverage areas can also see the locations of surrounding aircraft that are equipped with ADS-B or transponders in a 15-mile radius, 3,500 feet above or below their current altitude. ADS-B is available in about two thirds of the country and by 2014 coverage is expected in approximately all areas currently served by radar. The Technical Standards Order (TSO-C195) for ADS-B In equipment has been published and information is available in Advisory Circular 20-172. For more information about how ADS-B works, go to www.faa.gov/nextgen/ads-b/broadcastservices.

Whether using bonfires, shrimp boats, or high-tech satellites, the FAA's mission has always focused on providing the safest, most efficient aerospace system in the world.

Another NextGen area of progress is Data Communications, or Data Comm, which is expected to provide initial tower capabilities in 2015. Data Comm, a digital communications platform, uses electronic messages between pilots and controllers. These digitally delivered clearances will improve accuracy by eliminating misheard communications and confused call-signs and reduce radio congestion.

For more information on the progress of these and other NextGen initiatives, see the 2011 update to the NexGen Implementation Plan released in March. There is still a long way to go to realize its full potential, but the growing frequency of NextGen discussions is a sure sign that it is permeating the regular lexicon of pilots.

It's a Bird ... It's a Plane ... It's a Spaceship?

Air traffic is on the rise according to the FAA's 2011 Aerospace Forecast, which projects tower operations will increase 35 percent over the next 20 years accompanied by slow, but steady growth in aircraft manufacturing and hours flown. In addition to this growth, NAS users can also expect to share the skies with some new neighbors. Already developing at breakneck speeds are the many civilian commercial applications of Unmanned Aircraft Systems (UAS), ranging in size from a small bird to a medium-size airliner. Currently, the FAA manages commercial UAS operations on a case-by-case basis and scrutinizes them for safety and security implications. However, that process may soon become easier. FAA rulemaking efforts are underway that will—without compromising safety—provide standards for certain small civilian unmanned aircraft to have limited access to the NAS.

Another area under rapid development is *literally* out of this world. The FAA's Office of Commercial Space Transportation (AST), which licenses and regulates U.S. commercial space launch and reentry activity, is forecasting an average of 27.6 commercial orbital launches a year until 2019. So far, AST has also issued licenses for eight commercial spaceports located in six states, with eight additional spaceports in various stages of development.

While both the UAS and commercial space industries are still in early stages of development and are yet to be considered widespread users

of the NAS, their future integration may require a few changes to the plan. NextGen's open and collaborative approach towards problem-solving is designed to effectively factor in these and other challenges that might arise during the next phase of airspace evolution.

You Are Cleared for the Approach

To say the nation's airspace has witnessed a tremendous amount of change over the last century would be quite an understatement. Whether using bonfires, shrimp boats, or high-tech satellites, the FAA's mission has always focused on providing the safest, most efficient aerospace system in the world. Even in the early days of airspace development, we can see the great deal of planning, coordination, and outside-the-box thinking needed to overcome challenges and maintain safety in the NAS. Those same principles are alive and well today and are among the key tenets of NextGen, a model of safety and efficiency that promises access to all categories of users. That's something the founding fathers of ATC would surely be proud of.

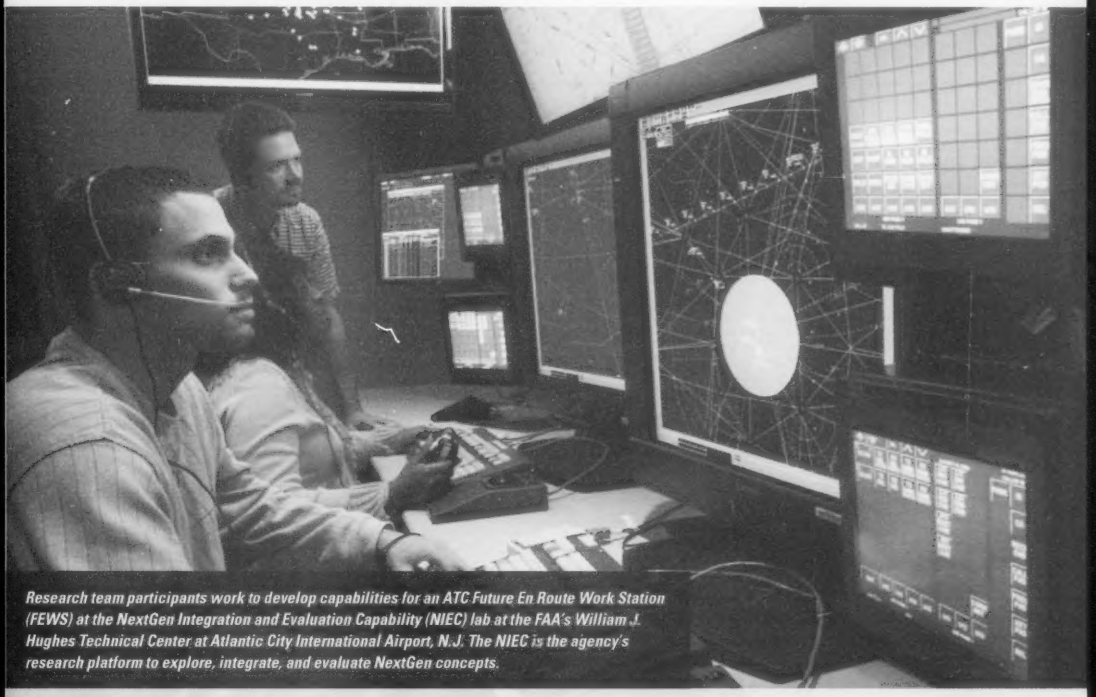
Tom Hoffmann is associate editor of FAA Safety Briefing. *He is a commercial pilot and holds an A&P certificate.*

For More Information

FAA National Airspace System
www.faa.gov/air_traffic/nas/

FAA NextGen Web site with 2011 NextGen Implementation Plan
www.faa.gov/nextgen/

Advisory Circular 20-172: Airworthiness Approval for ADS-B In Systems and Applications
www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2020-172.pdf



Research team participants work to develop capabilities for an ATC Future En Route Work Station (FEWS) at the NextGen Integration and Evaluation Capability (NIEC) lab at the FAA's William J. Hughes Technical Center at Atlantic City International Airport, N.J. The NIEC is the agency's research platform to explore, integrate, and evaluate NextGen concepts.

LYNN MCCLOUD

Pilot Professor Skyliner Helps Chart a Safer Future

Photos provided by R. John Hansman

"I am a research omnivore," is how R. John Hansman, Jr. sums up his approach to work. In case that sentence sends you to the dictionary, omnivore means being omnivorous, which, in turn, means eating any type of food indiscriminately. More appropriate for a conversation with Hansman—active general aviation pilot, professor of aeronautics and astronautics at Massachusetts Institute of Technology (MIT), Director of the MIT International Center for Air Transportation, and Chair of the FAA Research, Engineering and Development Advisory Committee (REDAC)—is the second definition. Omnivorous is also "taking in or assimilating everything, especially with the mind."

"In 10 years, Automatic Dependent Surveillance–Broadcast (ADS-B) will be almost routine. The ADS-B Out rule will create a huge market that will get us to low-cost units."

Omnivore is indeed apt for a researcher, teacher, and advisor (to students and to government officials) whose career has involved developing technologies, promoting an understanding of human factors, and exploring ways to use technology to improve flight safety.

Hansman, who began flying at age 14 (see sidebar), earned his undergraduate degree in physics. That led to graduate work in physics at MIT. But, his passion for flying led him to MIT's aeronautics program with a NASA-funded Ph.D. thesis on aircraft ice protection systems. The doctorate turned out to be in physics, yes, but also meteorology, aeronautics and astronautics, and electrical engineering.

The breadth of these studies has served Hansman and aviation safety well. After completing his doctorate he stayed at MIT and began to work on other aviation weather issues, including wind shear. "But, after working on weather, I got interested in human factors," he says. "There's a limited amount technology alone can do to improve safety. You can do much more if you can use technology to improve the decision making of pilots and controllers."

An initial area of Hansman's human factors research was on how information is provided to pilots. "We looked at early versions of electronic approach charts and studied ways to de-clutter them," he explains. His research team conducted tests on pilots in simulators and found the majority of the pilots had low levels of situational awareness, especially in terms of terrain. "That led to work on terrain awareness systems," Hansman says. His team did the initial display prototypes used in Allied Signal's Enhanced Ground Proximity Warning System (EGPWS), which made EGPWS available for smaller aircraft.

His current research interests focus on advanced cockpit information systems, including Flight Management Systems, Air-Ground Datalink, Electronic Charting, Advanced Alerting Systems, and Flight Crew Situational Awareness. The research he enjoys the most: "designing airplane cockpits and test flying."

His research led to his 2003 appointment to serve on the REDAC, a congressionally mandated committee that advises the FAA Administrator on research and development or, as Hansman puts it, "helps the agency out with technical problems."

A conversation with Hansman, who recently testified before Congress on the needed research to support timely implementation of Next Generation Air Transportation System (NextGen) technologies, inevitably turns to NextGen and its effect on general aviation.

"In 10 years, Automatic Dependent Surveillance–Broadcast (ADS-B) will be almost routine," he says. As for the ADS-B Out rule, the FAA mandate requiring aircraft be equipped with ADS-B Out by 2020, "it was the right thing to do," Hansman adds. "It will create a huge market that will get us to low-cost units."

He acknowledges that making the case for ADS-B benefits to the GA community has been a tough sell. "Still, with the precision and situational awareness available from ADS-B and other NextGen capabilities, we are adding levels of redundancy in the system that will enhance safety."

Professor R. John Hansman and family.

A Family in Flight

You will not always find Professor R. John Hansman, Jr. in a simulator, with graduate students, running an advisory committee meeting, or testifying to a congressional committee. He soloed in a Schweizer glider at age 14 and now instructs and tows gliders at the Greater Boston Soaring Club.

His father, who was a pilot and had a New England aviation insurance brokerage, started him in sailplanes, including a stint at a soaring school in Austria. Hansman's logbook started getting a workout during high school; he was flight instructing before he got his driver's license. "I hitchhiked to the airport," he reminisces.

He received his commercial certificate at age 18 so he could tow gliders. Later, he flew freight in Beech 18s between New Bedford, Martha's Vineyard, and Nantucket. Flying jobs followed every summer during college and graduate school.

Later, flying became an activity for his growing family. His daughter's first flight took place when she was 7 days old. When his two children were young, Ronald Reagan Washington National Airport (DCA), Washington, D.C.'s close-in airport, was open to GA and his hobby provided a neat solution to the annual Christmas Day in-law quandary. The family spent Christmas morning in Boston with his parents and then, laden with gifts, headed to Hanscom Field (KBED) and flew a Piper Arrow to DCA for Christmas dinner with his wife's family.

Hansman has more than 5,650 hours of pilot in-command time in airplanes, helicopters, and sailplanes, including meteorological, production, and engineering flight-test experience.

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Hansman and his MIT team are leading the effort on a GA safety benefit: traffic alerting. Their work on traffic alerting began with a review of 10 years of NTSB and NASA Aviation Safety Reporting System data. They found that a majority of actual and near GA mid-air collisions occur in the pattern or in close proximity to airports.

"With the better and more frequent location information available with ADS-B," Hansman says, "we envisioned the possibilities for developing a traffic alerting system that would work in the airport environment." This led to FAA funding MIT to team up with Avidyne to develop standards for a general aviation traffic alerting program. (See sidebar article "Reducing the Risk of Close Encounters.")

It was a discussion of Hansman's aviation research interests that led to the "research

Reducing the Risk of Close Encounters

"We want to provide general aviation more benefits from ADS-B." That is how David Gray, an engineer in the FAA's Air Traffic Organization's Surveillance and Broadcast Services Program Office (SBS), explains the work underway to develop a traffic alerting system.

Gray cites MIT research that found that general aviation aircraft experience the most near mid-air collisions when aircraft are in the pattern. In reviewing more than 10 years of NTSB mid-air collision accident reports, MIT researchers found that flights operated under parts 91, 135, and 137 had a high percentage—59 percent—of mid-air collisions in the airport pattern and airport vicinity. Further analysis of both the NASA Aviation Safety Reporting System database and the FAA's Aviation Safety Information Analysis and Sharing database confirmed the higher risk for mid-air collisions in the airport area.

"For pilots who aren't already using an alerting system, the key is developing an application that will alert pilots when other aircraft are nearby," Gray says. "With Automatic Dependent Surveillance–Broadcast (ADS-B) technology we can help reduce the risk of airborne aircraft-to-aircraft encounters."

The new application, named Traffic Situation Awareness with Alerts, will use ADS-B data to assess the safety level. If the system detects something unusual, it will generate a caution alert to call the pilot's attention to the situation immediately. "We're developing a prototype and planning to assess the system in both simulation and flight tests to support the publication of standards in 2013," Gray adds. "We have teamed with MIT and Avidyne and are on our way."

MIT is identifying scenarios for the new system's use, developing algorithms to detect the scenarios, and performing simulator assessments. Avidyne engineers will develop prototype hardware and software and perform the flight tests.

ADS-B In is providing an unprecedented level of pilot situational awareness. Already available in about two-thirds of the United States, ADS-B In-equipped aircraft enable pilots to see other aircraft that are equipped with transponders or ADS-B within a 15-mile radius, 3,500 feet above or below their current altitude on a graphical cockpit display. Free graphical weather and flight information is also available to users who equip their aircraft with ADS-B In using the Universal Access Transceiver (UAT) link.

The FAA started deployment of pilot traffic and weather advisory services in 2008 in order to benefit general aviation immediately. "This new service will give pilots an immediate benefit and incentive for equipment," says Jim Linney, an SBS program manager.

"Traffic Situation Awareness with Alerts is just one of the ways we can use new technology to improve safety," says SBS Chief Scientist Doug Arbuckle. "We like to think that in terms of safety benefits, the sky really is the limit."

omnivore" confession. He concluded by adding, "I am interested in whatever can make aviation safer, more efficient, and more environmentally friendly."

This passion comes from Hansman's experience flying in the United States and abroad. "I have flown in Europe and I have looked at air traffic control systems around the world. We have a really good deal in the United States. It's important that we maintain it."

Lynn McCloud is contributing editor of FAA Safety Briefing.

For More Information

MIT International Center for Air Transportation
http://web.mit.edu/aeroastro/labs/icat/

FAA's NextGen Web site
www.faa.gov/nextgen/

ADS-B Broadcast Services Web site
www.faa.gov/about/initiatives/nextgen/ads-b/broadcastservices/

Research, Engineering and Development Advisory Committee
www.faa.gov/about/office_org/headquarters_offices/ato/service_units/nextgen/research_tech_dev/research_planning/redac/

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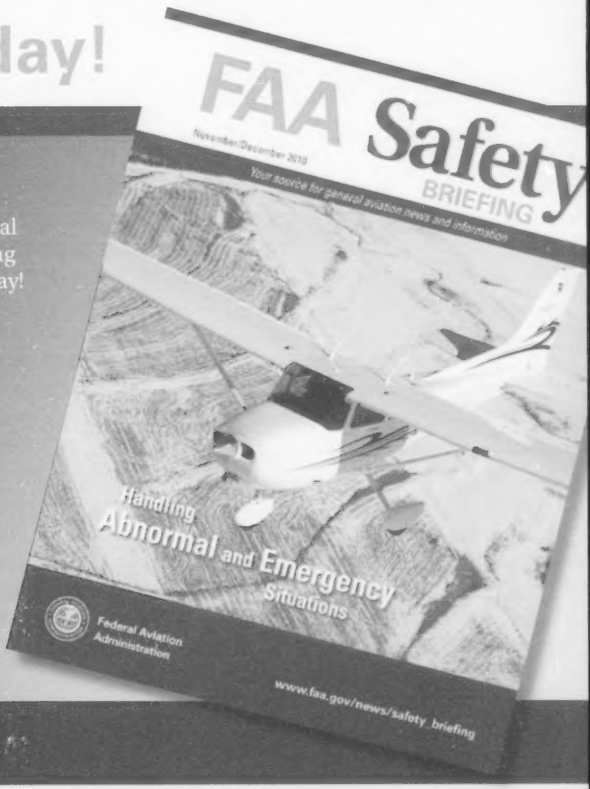


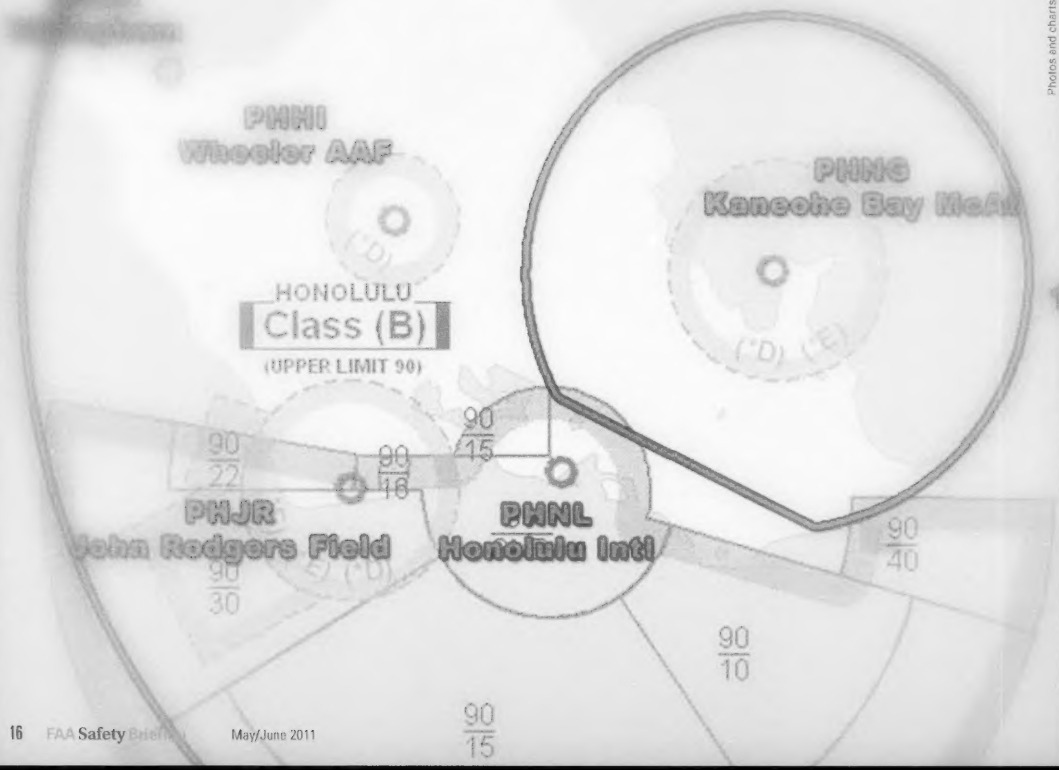
JAMES WILLIAMS

We're on a Mission

Taking the Mystery Out of Temporary Flight Restrictions

Since Temporary Flight Restrictions (TFRs) are a fact of life for today's pilots, it was clear that the topic had to be included in an issue issue devoted to the National Airspace System (NAS) and air traffic control. But, rather than repeat the tried, true, and admittedly tired explanations of *what* constitutes a TFR, we decided to focus instead on another angle: *who* constitutes a TFR, and *how* do they decide to establish such restrictions.

Even though I work for the FAA, I confess I started with the notion that "they" must be evil men and women in dark capes and masks, intent on curbing our fun in the sky. I set up an interview and, at the appointed time, walked through the doorway.



Photos and charts courtesy of FAA Air Traffic Organization Office of System Operations Security

Imagine my surprise to be greeted by life-sized statues of Jake and Elwood Blues, denizens of the classic 80s comedy "The Blues Brothers." I first assumed it was just an unexpected spark of quirky personalization in an otherwise drab government office. But, after speaking with members of the staff, I realized the statues were strangely appropriate. If you've seen the film, you might recall that Jake and Elwood Blues repeatedly insist that "We're on a mission from God." While no one in the Office of System Operations Security lays claim to a divine mandate, it is nonetheless clear that they have a strong sense of mission.

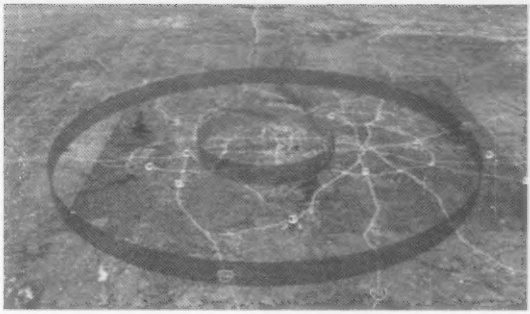
"We are truly GA's last advocate," says Frank Hatfield, director of System Operations Security. His office has the responsibility to work closely with various national and regional security agencies and organizations and determine how best to balance security requirements with the public's need for access to airspace. It's not an easy job. Hatfield and his staff face a daily challenge to balance very real security needs with the GA community's equally real need for access to the NAS.

For better understanding of how the TFR process works, I sat down with Brian Throop, Darrell Hood, and Rick Hostetler. "The main things we work in this shop are the Presidential and National Special Security Event (SSE)-type TFRs," Throop explains. "Darrell is our Homeland Security and law enforcement program manager, and so he works with the Secret Service on a regular basis to design and negotiate the airspace involved in VIP movements."

It's All about Balance

"Our overarching goal is balance," Throop continues. "We get requests from our law enforcement partners or security partners who say 'we need a TFR over X event.' We look at that request from an impact standpoint and coordinate with our local facilities. We try to apply an air traffic control or FAA filter to [the request]. If the initial request was 60 miles, could they work with 58? Could they start the TFR 10 minutes later? Could we get a cut-out area for this airport on the fringe? Our work is all about the many details and considerations involved in trying to lessen the impact on airspace users."

There is no question about the reality of security concerns. "We get a lot of requests for TFRs," Throop observes. "GA pilots may feel like TFRs pop up everywhere, but the number they actually see is probably only a tenth of the total requests. We get requests from virtually every police department, city council, mayor, or town manager with an event that they think merits a TFR."



A graphical depiction of the TFR surrounding the Dallas/Fort Worth area for Super Bowl 45 in February 2011.

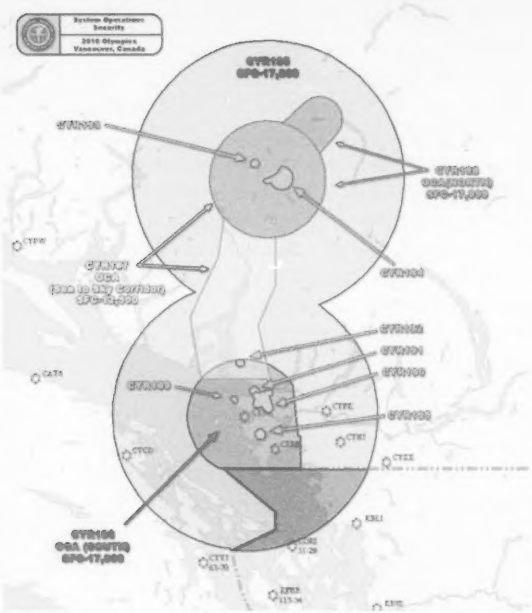
Happily for GA pilots, most requests simply do not meet the System Operations Security Office's criteria. The staff starts by reviewing the potential threat against the benefit of a free and open society. As Throop stresses, though, the FAA does not make this decision in a vacuum. "We go to our contacts at TSA and FBI, and we ask if they have credible threat information about the event in question. They reach out to their field offices and, in most cases, the answer is no. So we go back to the requesting organization and explain that the event doesn't meet our requirements for shutting down the airspace. On those rare occasions when TSA or FBI contacts do say that there is credible threat, we establish a TFR. But once we agree to the TFR, our priority becomes determining how quickly can we take it down and restore access to the airspace."

The staff of the System Operations Security Office clearly has a sense of mission to ensure maximum access for GA pilots.

Throop and his colleagues also stress that their advocacy is not confined to larger airports. "If there are pilots out there with a Maule or a Cessna with tundra tires taking off from a grass strip on their 250 acre farm, they have a need to use the airspace. So we advocate for that." Throop says. "We will do everything we can to get them in the air. We never, ever dismiss a restriction as 'well, it's just one person or just one airport.' Those people have an absolute right to access the airspace as much as possible."

Getting the Word Out

In addition to getting TFRs in place, the System Operations Security Office also has the challenge of notifying the pilot community in a timely way, explains Darrell Hood, Homeland Security/law enforcement liaison. An example the staff aims to avoid repeating is the TFR established in Hawaii during the President's vacations.



A graphical depiction of the TFR around Vancouver and the surrounding area for the 2010 Winter Olympics.

"In 2009, the President's visit to Hawaii virtually shut down much of the GA activity in the islands. For 2010, we worked with the General Aviation Council of Hawaii and the Secret Service to allow a lot more activity without compromising security," says Hood. "We're really proud of that."

I asked Hood what kind of flexibility the FAA has when it comes to issuing or denying a TFR. The answer: It depends. In some cases, legal requirements leave little, if any, flexibility. Short of that, though, the FAA tries to balance the competing and often conflicting needs of security and access.

"The threat is probably the most important thing we look at," notes Hood. "Is there a threat to either those in attendance, or to the event itself? Then we make a determination based on our analysis, along with input from law enforcement agencies, FBI, TSA, and Secret Service. They all have opinions, and they all have input. But then we make a decision."

Happily for GA pilots, most requests for TFRs simply do not meet the security criteria required to establish such restrictions.

Though it may not always appear this way to pilots looking at a TFR in their home airspace, Hood stresses the mission: "The FAA's mandate is free access to the airspace, so we try to honor that mandate on every request."

Rick Hostetler, manager of Classified Operations, gave me a good example of an instance when the FAA declined to act on a request for a TFR. "Last spring, the Masters was the first big golf tournament Tiger Woods played after his personal difficulties. The Masters tournament organizers wanted a TFR over Augusta because they were concerned about aircraft flying over for curiosity and press. As we saw it, though, the request did not meet our primary criteria. There was no credible threat, so we denied their request for a TFR. More often than not, that's how TFR requests are answered."

PLEASE Check NOTAMs!

When it comes to letting pilots know about TFRs, Hostetler explains that his office works very closely with pilot organizations. Still, it's a challenge. "There were six violators for the Super Bowl in Dallas. Not one of the violators knew there was a Notice to Airmen (NOTAM) for the Super Bowl because they didn't check the NOTAMs," Hostetler says. "All the flights involved originated within 40 miles of the game and five of them actually originated inside the TFR. Despite all of the media coverage and all the outreach we did, we still had six violators." The goal of course, although an elusive one, is to have no TFR violations.

As I passed the Blues Brothers statues on my way out of the System Operations Security Office, I did feel better about GA's position in today's new world of security restrictions. There really are people out there—or rather, in this very building—advocating for GA. They may not win on every decision, but they are on our side, fighting every day to make sure our needs for access to the NAS are not only considered, but advocated and protected. Like the film's protagonists, this small office keeps on going despite the enormity of the task and the difficulty of the odds. They do it without much recognition and with no fanfare. But, as it turns out, they may well be the best friend GA has in its ongoing struggle to safeguard access to the NAS.

My final question: What would you like the GA world to know?

"I'd like GA pilots to know one thing," Hood says. "We are their advocate for access to the airspace. But I'd also like to make a request: PLEASE, please check NOTAMs."

You can find NOTAMS on FAA's Web site: pilotweb.nas.faa.gov.

James Williams is FAA Safety Briefing*'s assistant editor and photo editor. He is also a pilot and ground instructor.*

TOM HOFFMANN

Into the DEN

It started with an impromptu meeting on the morning of Sept. 11, 2001. Members of the FAA's management team organized a series of conference calls in an attempt to make sense of the confusing and often conflicting information flooding phones and newswires that morning. As the urgency of the events grew, so did the number of participants joining in. Quickly, these calls merged to become a vital communications and planning tool for the FAA and other government agencies.

Now, nearly a decade later, that same merged conference call remains connected to this day and operates around the clock. Officially known as the Domestic Events Network, or DEN, the teleconference helps monitor the security of the National Airspace System (NAS) 24 hours a day, seven days a week, by keeping all relevant authorities notified of emerging safety and security issues.

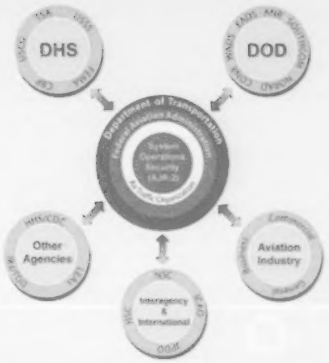
Although physically housed at FAA Headquarters in Washington, D.C., the DEN is comprised of a network of active listeners in various locations, from such agencies as the departments of Defense and Homeland Security to the thousands of air traffic controllers at control towers, approach controls, and Air Route Traffic Control Centers (ARTCC) nationwide.

"More than 150 groups are actively listening on the DEN at any one time," says Rally Caparas, FAA acting manager of National Tactical Operations Security. "Having real-time access to just about every resource we need to mitigate an aviation emergency or security-related event means that we're able to be much more proactive. We can handle a threat well before it becomes a crisis."

Among the required reporting events the DEN tracks are restricted airspace violations, lost radio communications, changes of destination while on an IFR flight plan, emergencies, and VIP movements involving the President and Vice President of the United States.

Since the DEN relies heavily on interagency coordination, a clear set of policies and procedures is crucial. A 2005 U.S. Government Accountability Office report that looked into the security of the NAS discovered room for improvement.

"Over the years, we've greatly enhanced the collaboration among agencies," explains Caparas. "We now have more unified and more clearly defined roles, and the management structure has adjusted to better meet the needs of supporting our overall mission." Growth has also been a big part of change to the DEN; FAA System Operations Security staffing for this role has steadily increased during the last three years. According to Caparas, having more hands on deck helps the group to manage the huge responsibility and mitigate issues at an early stage.



That engagement strategy goes beyond regular communication with ATC; it also extends directly to the general aviation community. During special events, such as the Vancouver Winter Olympics or the Super Bowl in Dallas, members of the DEN work with local Flight Standards District Offices to host GA outreach briefings. These sessions help keep pilots aware of upcoming restrictions. The DEN also works with coordinating agencies during a special event to lessen the impact on the flying community, often traveling ahead of time to the area to coordinate in person. "We're here to try and make things as available as possible," says Caparas. "We do our best to open routes and minimize limitations by keeping any restrictions confined as close to the affected area as possible."

Caparas notes that the DEN is not a fool-proof system against airborne threats, but is confident that it adds one more layer to the complex task of keeping the skies safe. "What we have is unlike anything else in the world," says Caparas, "and it presently serves as a key element for effective NAS security."

Tom Hoffmann is associate editor of FAA Safety Briefing. *He is a commercial pilot and holds an A&P certificate.*

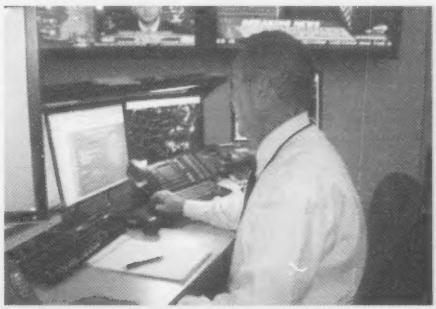


Photo and chart courtesy of FAA Air Traffic Organization Office of System Operations Security

The DEN has a network of active listeners who monitor NAS security around the clock.

Change is in the Air:

NOTAM Modernization Moves Ahead

A technician works on an ILS Localizer antenna system. When this type of work shuts down an ILS, the FAA issues a NOTAM to give pilots a heads-up.

For many pilots, the mere mention of Notices to Airmen—better known as NOTAMs—prompts a range of reactions. None are complimentary. Almost universal is a sense of head-scratching bewilderment (what *is* all that gibberish?!) and head-banging frustration (why does it have to be so *hard* now that there are apps for everything?!). Also, the avalanche of arcane abbreviations can easily obscure information truly relevant and important to your flight.

I can relate. Before the January 2008 reform that folded the former L (local) NOTAM into a new super D (distant) NOTAM format (see "Know Your NOTAMS" in the Jan./Feb. 2008 issue of *FAA Aviation News*), I remember preparing for a flight to Sun 'n Fun. The D NOTAMs in my official weather briefing included prominent references to volcanic activity in Montserrat. But, since the now deservedly defunct L NOTAMs were not distributed beyond the defined local area, there was nothing at all about the temporary control tower at KVDF, the normally non-towered destination airport.

While GA pilots are grateful for the informational improvements engendered by the new super D NOTAM format, the enduring—and larger—headache comes from FDC (Flight Data Center) NOTAMS. The first task is to sift through the many pages (or screens) in search of those NOTAMs relevant to your flight. Next is to parse puzzling phraseology that only a machine can truly appreciate. For instance:

1/7959 ZOB PART 2 OF 5 FLIGHT RESTRICTIONS CLEVELAND, OHIO, NOT INCLUDING 18000 FT MSL EFFECTIVE 1102221530

UTC (1030 LOCAL 02/22/11) UNTIL 1102222045 UTC (1545 LOCAL 02/22/11). WITHIN A 12 NMR OF 412659N/0814445W OR THE DJB079019.6 UP TO BUT NOT INCLUDING 18000 FT MSL EFFECTIVE 1102221530 UTC (1030 LOCAL 02/22/11) UNTIL 1102222045 UTC (1545 LOCAL 02/22/11). EXCEPT AS SPECIFIED BELOW EXCLUDING CANADIAN AIRSPACE AND/OR UNLESS AUTHORIZED BY ATC IN CONSULTATION WITH THE AIR TRAFFIC SECURITY COORDINATOR VIA THE DOMESTIC EVENTS NETWORK (DEN)....

The FAA has made that task much easier with the introduction of plain English NOTAMs with graphics, available online at http://tfr.faa.gov/tfr2/list.html. Still, why are FDC NOTAMs so inscrutable and what is the FAA doing to fix them?

AIM-ing for Improvement

The short answer: A lot. "We know it's a huge issue for pilots, and we really are making progress toward a modernized NOTAM system," says the FAA's Barry Davis. As manager of the Aeronautical Information Management (AIM) group (*see sidebar*), Davis and his team aim to provide the right data at the right time in the right place. The AIM group was at the forefront of the "L over D" effort in 2008. Along with an array of alphabet government and industry organizations in the United States and abroad, the team has been working concurrently on the much greater challenge of reforming the entire Federal NOTAMs System (FNS), which includes the much-maligned FDC NOTAMs.

Davis well understands pilots' frustration with a product-oriented system rooted in telegraph times. "What pilots, dispatchers, and controllers need," he acknowledges, "is a system that will allow them to sort, filter, alert, transpose, and fuse this information." Davis defines these functions as follows:

- *Sort*—the system provides all data relevant to the route, including departure and destination airports.
- *Filter*—using a tool, such as the 12 keywords in the super D NOTAM, the system organizes the data into meaningful categories (e.g., RWY, COM, OBST).
- *Alert*—the system flags areas of special note or concern, e.g., closed runway or temporary control tower.
- *Transpose*—the system automatically converts raw data into a graphical presentation that would be displayed on a cockpit moving map display.
- *Fuse*—the system is capable of correlating its data with data from other sources, such as weather, to offer the pilot a more complete decision-making tool.

The key to creating this capability is to transition from the traditional product-based system to a data-based approach. And, as Davis describes it, "database" is actually a very good word for the changes now underway. "With the product-oriented system we have now, our automation can't do much more than sort in a fairly general way," he notes.

The 2008 introduction of keywords in the super D NOTAM has given the automation—and thus the NOTAM product's human end-users—some ability to filter. To get to the next levels, though, the system has to be a fully digitized database. "Think about how a database works," says Davis. "Once a database is populated with discrete structured facts, end-users can choose from any number of views to display the specific information they need."

Pilots, dispatchers, and controllers need a NOTAM system that will allow them to sort, filter, alert, transpose, and fuse important information.

Managing the Many Moving Parts

Though it may sound simple, this transition is something akin to major overhaul on an airplane while it is still flying. "If you look at what we have now and where we need to be, it's easy to conclude that we just can't get there from here," says Davis. A favorite and highly memorable part of his PowerPoint presentation arsenal is a slide known to the AIM team as the "hairball diagram." By showing the dizzying number of NOTAM-generating organizations, the tangle of system entry and data validation points, and the similarly confusing array of output and distribution options, the hairball diagram amply illustrates the challenge confronting any NOTAM modernization effort. It also illustrates several of the core challenges. A new system must be:

- *Globally compatible*—Aviation is inherently global, and the standards established by the International Civil Aviation Organization (ICAO) are essential to safe and efficient worldwide operation. Changes to the U.S. NOTAM system have to be compatible and/or compliant with ICAO standards.

Photo by Jan Ettinger

- *Automation-acceptable*—The system, whether product- or data-based, has to work now with existing systems and with future systems.
- *User-friendly*—Though no one would argue that the existing system is friendly to its various end-users, it has the advantage of being the devil we know. As Davis observes, an overnight "here" to "there" shift would be both overwhelming and disruptive.

The AIM group is addressing these challenges one step at a time. The obvious way to ensure global compatibility is to adopt the ICAO NOTAM format, much as we transitioned a few years ago to ICAO standards for defining airspace and reporting weather. If the prospect of learning a new system makes you groan, that is where the AIM group's incremental change strategy for dealing with the automation-acceptable and user-friendly requirements comes in.

First, many of the necessary technical changes to support the digital collection, processing, and dissemination of NOTAM information are occurring in the background. NOTAM-generating entities are already beginning to use the Aeronautical Information Exchange Model coding specification (AIXM) to format basic NOTAM information in accordance with the global ICAO standard. This fiscal year, the FAA's goal is for digital collection, processing, and distribution of 25 percent of all NOTAMs. The goal rises to 60 percent in fiscal 2012. Because the digital formats will allow

The data-based and digitized NOTAM system will allow pilots to choose the product(s), or "views," they want to generate from the overall database of aeronautical information.

Aeronautical Information Management Group

The FAA's AIM group is the authoritative U.S. government source for collecting, validating, storing, maintaining, and disseminating aeronautical data concerning the United States and its territories to support real-time aviation activities. AIM provides the following services:

- Aeronautical Information Services, consisting of the National Flight Data Center (NFDC) and the Terrain and Obstacle Data Group (TOD)
- Alaska Aviation Camera program
- NOTAM Services Group, supporting NOTAM, CARF, and Military Operations systems
- Traffic Repository
- NAS Data Release Group

Key Programs:

- NOTAM Distribution Program (NDP) facilitates the automation, dissemination, and receipt acknowledgement of NOTAM messages in the Terminal and En Route domains.
- NAIMES provides highly reliable, scalable, and secure aeronautical information data services to users and access to critical data products and services to customers and stakeholders.
- MILOPS utilizes advanced Web-based technology to provide the NAS users and planners with near real-time information as to the Special Use Airspace.

for such things as putting a red X on a moving map navigator's display of a closed runway, they will meet all five of the requirements Davis outlined: sort, filter, alert, transpose, and fuse NOTAM information. The result will be better service to all kinds of end-users.

Second, as noted, the data-based and digitized NOTAM system will allow pilots to choose the product(s), or "views," they want to generate from the overall database of aeronautical information. A pilot who flies internationally can choose to display information in the ICAO NOTAM format. Those of us who fly domestically will not be required to learn the ICAO format, though, because we will have the ability to select another product—for instance, a plain English narrative with *relevant* information (no more volcanoes in Montserrat!) and graphical depictions.

Third, the AIM group is taking an incremental approach to introducing those changes that *will* require pilots to learn and adjust to new formats. The 2008 merger of L and D NOTAMs is one example of this approach. Davis notes that another incremental change is likely to be announced right about the time this issue of *FAA Safety Briefing* is published. As part of the transition to an ICAO-compliant system, which will ultimately eliminate the distinction between FDC and D NOTAMs, changes will:

- Add keywords to FDC NOTAMs, to include ODP, SID, STAR, CHART, DATA, IAP, VFP, ROUTE, and SPECIAL.
- Eliminate the keyword RAMP, keeping only the APRON keyword.
- Replace obscure terms such as UFN, WIE, WEF, and TIL with the ICAO terms, EST (estimated) and PERM (permanent).

"It's a big river we're trying to cross," says Davis, "but, one bridge at a time, we're getting there."

Susan Parson is a special assistant in the FAA Flight Standards Service and editor of FAA Safety Briefing. *She is an active general aviation pilot and flight instructor.*

For More Information

FAA NOTAM policy page
http://notams.aim.faa.gov

Aeronautical Information Management Group
www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/aeronautical_im/

Calling All Mechanics

Keep Informed with

FAA's Aviation Maintenance Alerts

Aviation Maintenance Alerts (Advisory Circular 43.16A) provide a communication channel to share information on aviation service experiences. Prepared monthly, they are based on information FAA receives from people who operate and maintain civil aeronautical products.

The alerts, which provide notice of conditions reported via a Malfunction or Defect Report or a Service D[illegible]rt, help improve aeronautical product durability, reliability, and maintain safety.

Recent alerts cover:

- Cracked firewall doubler on the Cessna 182S
- Failed ignition switch on the Cessna 172S
- Failed pushrod shroud springs on the Lycoming O540

Check out *Aviation Maintenance Alerts* at: ***www.faa.gov/aircraft/safety/alerts/aviation_maintenance/***

KIMBERLY PYLE

Photos courtesy of AVO

Let's Be Clear

Improving Pilot-Controller Communications

You are nearing the end of a long southbound flight to Elizabeth City, N. C. (KECG). You are focused on making the descent from the 7,000 MSL cruising altitude to the 1,012 MSL traffic pattern altitude. The tower controller clears you to land on runway "one zero." You wanted, and thus unconsciously expected, a clearance to land on runway "zero one" since flying a downwind leg for runway zero one will give you more time to configure the airplane. The strategy works, but you realize the mistake when the controller quickly amends your clearance for landing on zero one.

Such mistakes happen on a regular basis. In fact, last year's FAA data indicate that a failure to comply with an air traffic control clearance for altitude, heading, or runway was a common pilot mistake, or deviation. Almost always these unintentional occurrences result from an innocent mistake.

Human factors are often involved. Sometimes pilots take the wrong clearance from air traffic control because their call sign sounds similar to another call sign on the same frequency. Sometimes it is because they have an "expectation bias," meaning they hear what they expect to hear and not what was actually said. And, sometimes it is just the result of a radio frequency that is not clear.

All humans make mistakes and, despite our best efforts, pilots are no different. But the consequences can be severe when the mistake is made in a machine traveling 200 miles an hour at 2,500 feet or higher.

So, what's a pilot to do?

"Don't be afraid to ask us to confirm a clearance," says Daniela Aguerre, an air traffic controller at Miami Center. "We are members of the same team, so if you aren't clear, ask us, no matter how busy we sound. We will slow down to help."

AOPA's *Flight Training* magazine offers the same advice.

> *Regardless of the information transmitted, there should never be a question in a pilot's or controller's mind that both are talking about the same thing. If you have a question, 'verify' is the word you use to ensure you have the right information. For example, you say, 'Verify Hometown Tower on one-two-three-point-four,' if you think you mishear the tower frequency.* (Excerpt from "New Pilot's Guide to ATC Communication" by Robert I. Snow)

Easier said than done? Even controllers will admit that asking them to repeat a clearance can be intimidating.

"I have heard that some pilots have a misconception of ATC—that we're mean or harsh," Aguerre said. "Because our phraseology is so prescribed and strict, it can make us sound unfriendly. We're not. We are really just following the rules."

FAA's Aeronautical Information Manual (AIM) includes phraseology guidance for pilots, but the requirements for controllers are more extensive. Controllers regularly have sessions with their supervisors, called "tape talks," where their FAA's Aeronautical Information Manual (AIM) suggests the following:

4-2-4. Aircraft Call Signs

a. Precautions in the Use of Call Signs.

1. Improper use of call signs can result in pilots executing a clearance intended for another aircraft. Call signs should *never be abbreviated on an initial contact or at any time when other aircraft call signs have similar numbers/sounds or identical letters/number;* e.g., Cessna 6132F, Cessna 1622F, Baron 123F, Cherokee 7732F, etc.

EXAMPLE-
Assume that a controller issues an approach clearance to an aircraft at the bottom of a holding stack and an aircraft with a similar call sign (at the top of the stack) acknowledges the clearance with the last two or three numbers of the aircraft's call sign. If the aircraft at the bottom of the stack did not hear the clearance and intervene, flight safety would be affected, and there would be no reason for either the controller or pilot to suspect that anything is wrong. This kind of "human factors" error can strike swiftly and is extremely difficult to rectify.

2. Pilots, therefore, must be certain that aircraft identification is complete and clearly identified before taking action on an ATC clearance. ATC specialists will not abbreviate call signs of air carrier or other civil aircraft having authorized call signs. ATC specialists may initiate abbreviated call signs of other aircraft by using the *prefix and the last three digits/letters* of the aircraft identification after communications are established. The pilot may use the abbreviated call sign in subsequent contacts with the ATC specialist. When aware of similar/identical call signs, ATC specialists will take action to minimize errors by emphasizing certain numbers/letters, by repeating the entire call sign, by repeating the prefix, or by asking pilots to use a different call sign temporarily. Pilots should use the phrase "VERIFY CLEARANCE FOR (your complete call sign)" if doubt exists concerning proper identity.

3. Civil aircraft pilots should state the aircraft type, model or manufacturer's name, followed by the digits/letters of the registration number. When the aircraft manufacturer's name or model is stated, the prefix "N" is dropped; e.g., Aztec Two Four Six Four Alpha.

EXAMPLE-
1. *Bonanza Six Five Five Golf.*

2. *Breezy Six One Three Romeo Experimental (omit "Experimental" after initial contact).*

Photo courtesy of National Air Traffic Controllers Association

transmissions are played back and every non-standard bit of phraseology is noted.

Despite never seeing each other's faces, pilots and controllers must work together with what Aguerre refers to as "blind trust."

"Everyone plays a part," she says. "They have to trust we're giving them the right safety advice and we have to trust that they will follow it."

"Because our [ATC] phraseology is so prescribed and strict it makes us sound unfriendly. We're not."

A member of the National Air Traffic Controllers Association's Safety Committee, Aguerre has five suggestions for GA pilots entering controlled airspace:

1. **Be brief on initial check-in.** This is mainly an issue when pilots are VFR. State call sign and request VFR flight following. Then, just answer the controller's questions briefly, such as position, aircraft type, and destination; additional information usually ties up the frequency. You can contact the controller later to ask questions or provide additional information. Use your judgment: You can usually tell when a controller is busy, so use that as a guide to how you use the frequency.
2. **Be attentive to the frequency, especially when VFR.** If a pilot asks for flight following, it is distracting to a controller when the pilot does not answer communications, especially traffic calls. Since there can be so many reasons why a pilot does not answer a call, it takes the controller's focus away from IFR traffic.
3. Especially in inclement weather, **ask controllers for deviations as many miles in advance as possible.** This allows controllers to plan for other traffic and coordinate with other ATC sectors or facilities. Also, be prepared to go with an alternate plan if at all possible, such as deviations to right instead of left, if that is what you requested.
4. **Give controllers PIREPS (pilot reports)!** Controllers can share the information with other pilots and get a more accurate picture of what the weather is doing.
5. **Ask, do not assume!** If you do not understand a clearance, use the words "Confirm" or "Verify." Controllers prefer to repeat or clarify a clearance (even when they are busy) rather than have a pilot execute the wrong clearance, which may cause problems for other aircraft in the sector.

FAA's Vice President for Air Traffic Technical Training, Dr. Robert Tarter, has his own advice for GA pilots traversing controlled airspace.

"Use your call sign, every time," Tarter says. This echoes the guidance in the AIM.

Last year, as part of the FAA's Partnership for Safety outreach to improve pilot-controller communication, Tarter visited 52 airlines across the country to encourage pilots to use call signs and professional phraseology in every transmission. The same best practices apply to GA pilots flying in controlled airspace. And, since communication errors are leading contributors to losses of separation and runway incursions, following these simple tips can make a big difference.

After all, the safety of your flight—the safety of all flights—is our highest priority.

Kimberly Pyle is the program manager for the FAA's Partnership for Safety. She works in the Air Traffic Organization's Safety Office promoting better pilot-controller communications through outreach, awareness, and training.

For More Information

AOPA Flight Training "New Pilot's Guide to ATC Communication"
http://flighttraining.aopa.org/students/presolo/special/atccomm.html

FAA Aeronautical Information Manual, Chapter 4, Section 2: "Radio Communication Phraseology and Techniques"
www.faa.gov/air_traffic/publications/ATpubs/AIM/Chap4/aim0402.html

SUSAN PARSON

Checklist

Bringing Fresh Air to the FIRC

If a pilot certificate is a license to learn, you might understandably regard an instructor certificate as a license to teach, which it is. But, just as a good pilot never stops learning to fly, a good instructor never stops learning to *teach* flying.

To encourage this mindset, in 1965 the FAA started a flight instructor refresher program to standardize training for renewal of an instructor certificate. Since 1977, the FAA has delegated the conduct of flight instructor refresher training to qualified industry organizations. In addition to approving organizations to sponsor these courses, now known as Flight Instructor Refresher Courses, or FIRCs, (the term Clinics was recently dropped), the agency reviews and approves the sponsor's training course outline (TCO). Attending an FAA-approved sponsor's FIRC provides an acceptable way for qualified instructors to renew their flight instructor certificates or to maintain qualification as chief or assistant chief instructor at a part 141 school. The FAA strongly encourages anyone who is interested to sign up and keep up with the most current trends, techniques, and special emphasis areas in flight training.

Refreshing the Refresher

With so much invested in the FIRC approach to CFI recurrency, the FAA keeps close watch on the process and the providers. In keeping with goals set out in the FAA's 5-year plan for GA accident reduction, the agency recently convened a blue-ribbon group of aviation industry FIRC sponsors to consider whether and how to refresh the refresher course.

"There was certainly some initial trepidation," says Aviation Safety Inspector Greg French, who organized and moderated the two-day FIRC forum. "In the end, though, the discussion was positive, and it produced a wide range of ideas for improvement." Importantly, most are ideas that FIRC sponsors can implement voluntarily. The group agreed that it would be useful for the FAA to incorporate other concepts in an update, now underway, to Advisory Circular (AC) 61-83F, *Nationally Scheduled FAA-Approved Industry-Conducted Flight Instructor Refresher Clinics.*

Beyond Stick and Rudder

Whether you are an instructor, a student, or a pilot at any certificate level, the FIRC changes will affect you through their impact on the overall flight training culture. One of the FIRC forum's most important outcomes was consensus on the need for FIRC sponsors to weave the threads of professionalism, ethics, and safety culture into all aspects of their TCOs. "Everyone agreed on teaching CFIs to impart not just physical flying skills, but also safety risk management skills," adds French.

The revised core topics list that participants developed is impressive. As French observes, the list reflects a fundamental philosophical shift. "While some favored a back-to-basics approach, most believe it is far more important to keep the CFI up to date on significant changes in GA, including regulations, guidance, and causal factors in GA accidents. The new list includes navigating in the 21st century, security issues, conducting an effective flight review, safety culture and safety trends, avoiding pilot deviations, and flight instructor professionalism."

Cooperation and Collaboration

In addition to updating AC 61-83F, the next steps include promoting FIRCs as the preferred method of CFI renewal; encouraging more non-CFIs to attend; considering a possible industry certification for FIRCs; ensuring testing that is rigorous, relevant, and reliable; and stepping up FAA participation in face-to-face FIRCs.

"The FIRC forum went a long way toward building a cohesive group eager to work with the FAA—and each other—to improve GA safety," says French. "It is truly one of those rare win-win-win situations for the FAA, airmen, and industry."

Susan Parson is a Special Assistant in the FAA's Flight Standards Service and editor of FAA Safety Briefing. *She is an active general aviation pilot and flight instructor.*

KYLE PEARSON

A MEETING of the MINDS

Pilots and Controllers Cooperate to Improve Safety

Westchester Country Airport (KHPN), located about 30 miles north of midtown Manhattan, can be a busy place. It routinely reports operations counts during a 17-hour day that surpass those of nearby Teterboro—a hive of business and general aviation activity that operates around the clock—and even eclipses those at major airports, such as Pittsburgh and Cleveland Hopkins. The airport hosts an assortment of aircraft, from commercial airliners to corporate jets to single-engine Cessnas flown by private pilots.

The air traffic controllers in the tower strive to take care of all the pilots who fly in and out of the airport—and not just by guiding them safely on and off the two runways and around the network of taxiways. The controllers, supervisors, and air traffic manager have moved beyond communicating only via headsets; they work with the pilots of Westchester to build a sense of community and cooperation.

The main means of getting pilots and controllers together—apart from speaking over the radio frequencies, of course—is a quarterly meeting set

Photos courtesy Westchester County

up by the Westchester Aviation Association, an airport user organization that calls itself the "voice of general aviation."

The basis for the meetings was a simple idea, according to Scott Dyer, a pilot who operates out of Westchester and organizes and moderates the meetings: Communication helps make the airport safer.

"Safety has improved the more we talk to each other and understand what's going on, on both sides of the microphone," says Dyer.

Nancy Reilly, a controller at the Westchester Tower, agrees. She says creating a strong relationship between the controllers and pilots fosters a better operating atmosphere at the airport.

"Controlling airplanes only works if there's cooperation," Reilly says. "And, we have fantastic cooperation at this airport."

The meetings have had an impact. They have made pilots more aware of potential trouble spots in the airspace around New York, provided a forum for discussing VFR routings, and given pilots a clearer understanding of land-and-hold-short (LAHSO) procedures.

In the fall of 2006, the then-president of the Westchester Aviation Association suggested to members that arranging a regular meeting with FAA personnel would be beneficial to both sides. Dyer, who says he has always had an interest in air traffic control, volunteered to set up and run the meetings.

"It was a good way to pursue [my interest in air traffic control] and broaden it for the benefit of the rest of the community," says Dyer. "It was something I wanted to do and I still take great joy in doing it."

The series of meetings is now in its fifth year, and three air traffic managers have kept them going. Controllers attend on a voluntary basis, according to Laura Stensland, the current air traffic manager at the tower, but she tries to arrange for them to participate during their scheduled working hours. Generally, three or four controllers attend each meeting, along with a supervisor, the air traffic manager and, lately, Ralph Tamburro, the traffic management officer from New York Terminal Radar Approach Control (TRACON).

Dyer says Tamburro's input has been tremendously helpful in giving the pilots a better understanding of the airspace that surrounds the airport. And, though Tamburro's focus has been on improving capacity and throughput for corporate operators, his efforts have a benefit for private pilots as well.

"Ralph has been tenacious in terms of trying to eke out the additional two, three, four more departures an hour whenever he can," Dyer says, "which is a great benefit to everybody at the airport because it results in less congestion on the ground and less pressure on the departure gates that would also be in use by the airlines. Now, that doesn't so much affect private flyers, except for folks who might be flying some sort of turbine equipment, but it certainly works to our benefit in terms of eliminating ground delays and long lines waiting for takeoff."

"Communication helps make the airport safer."

Tamburro has also discussed VFR routings with pilots, to help both sides understand which routes are preferable and to help pilots become more familiar with the situations that dictate which routes are used. That familiarity, he says, encourages situational awareness, which improves safety.

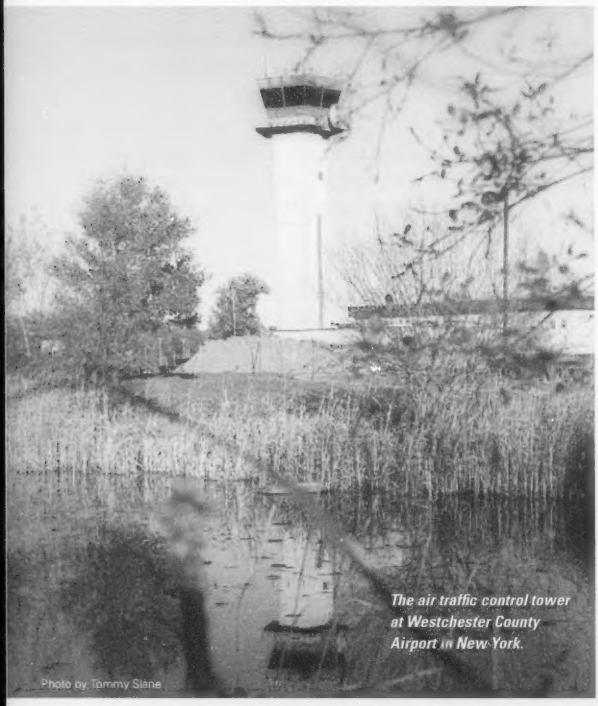
"[Pilots] really ask for suggestions: What works best for us, what works best for them. What they like and what we would prefer," Tamburro says. "We have many ways of handling VFR aircraft, so we explain some of the situations—why we take airplanes certain directions and certain altitudes—so they are more familiar with [how we do] things."

For the most recent meeting, Tamburro was joined by Ed Garlick, the support manager for quality assurance at New York TRACON. Garlick discussed some areas of New York TRACON's airspace that the FAA had noticed were prone to safety concerns.

The meetings have made pilots more aware of potential trouble spots in the airspace around New York.

Most of the 20 or so pilots in attendance were very interested in learning more about the procedures. Some were even taking notes, says Bob Degennaro, a front line manager at the tower.

"We talked about what airplanes could [perform the procedure] and when they can refuse," says Reilly. "Because some [pilots] think that when a controller tells you to do something you better do it. Now, we prefer that you do it, but part of it is letting them understand that if they prefer not to, the sooner they let us know, the more time we have to develop another plan."



The air traffic control tower at Westchester County Airport in New York.

Photo by Tommy Slane

Helping pilots understand procedures and their role in the operation is one of the great benefits of the meetings, explains Reilly. The meetings are organized as a roundtable discussion that follows a few presentations. The open discussion encourages pilots to freely ask the controllers questions so they can get a better understanding of the operation and how to improve it.

"We certainly have the opportunity to raise any sort of one-off questions that we have in the course of the meetings," says Dyer. "And [one of the ATC professionals] will endeavor, if they don't know the answer off the top of their heads, to get the answer and to work with us in terms of improving procedures."

If a pilot is interested in setting up a similar meeting at his or her airport, Dyer suggests approaching the air traffic manager and offering some examples of potential discussion topics. Encouraging the FAA to consider things ATC would like to discuss at the meetings would be helpful and start the meetings as a two-way street, Dyer explains. He also recommends asking that supervisors, controllers, and personnel from a TRACON be included, as they are at Westchester, where, he said, their experience is very helpful.

Reilly adds that some pilots, especially those who often fly out of non-towered airports, may not even realize that they can talk to controllers at these kinds of meetings. They are not as familiar with working with FAA controllers and may not understand that they are able to have some input into how operations are run. Meetings like those at Westchester help to both make it clear that pilots have a say and give them a platform to express it. "Understanding that pilots can affect change is a good thing," she says.

At Westchester, however, that idea has become very well understood, much to the benefit of the people on both sides of the microphone.

"We have a very good working relationship with our pilots here," Reilly adds. "I think we have a great respect on both sides. When you treat people with respect and with courtesy, and you're friendly as well, people are more willing to help."

Kyle Pearson is a writer for FAA Today *and the FAA Air Traffic Organization's* ATO News.

TOM HOFFMANN

Nuts, Bolts, and Electrons

So, You Want to be an Aircraft Mechanic?

Learn What It Takes to Become an Aircraft Maintenance Professional

People with a passion for aviation can appreciate how addictive it can be. If you are one of those bitten by the aviation bug, you may find yourself studying an aircraft in flight and imagining how satisfying it would be to defy gravity at its controls. But, under the sleek, polished exterior cruising around the skies lies its heart: the mechanical system that is as dependent on the technicians who service and repair it as it is on the pilots who operate it. Mastering this complex system is an art as old as the Wright Flyer.

Whether you are a pilot with a penchant to go beyond the 32 preventive maintenance items allowed by regulation or someone whose goal is to be dedicated to practicing and advancing the science of aviation maintenance, it is important to know your options and requirements when considering becoming an FAA certificated aircraft mechanic.

The Basics

You may be familiar with the two basic components of an aircraft mechanic certificate: the airframe rating and the powerplant rating (A&P). Each part affords the holder a specific set of privileges and limitations. What might surprise you is that it takes a minimum of 1,900 hours of training to be eligible for a mechanic certificate with A&P ratings. Many A&P candidates go beyond that number, which is significantly greater than the 40 flight hours required for a private pilot certificate and which even eclipses the number of hours required for an airline transport pilot (ATP) certificate.

For a mechanic certificate with A&P ratings, the FAA also requires you to pass not one, not two, but *three* separate written, oral, and practical exams. These include one set for each airframe and powerplant rating and another set for general knowledge tests. You can choose to obtain a single airframe or powerplant rating; however most mechanics elect to have both ratings so they are free to work on either engine or airframe components. See Title 14 Code of Federal Regulations (14 CFR) part 65.71 for more on A&P rating eligibility requirements.

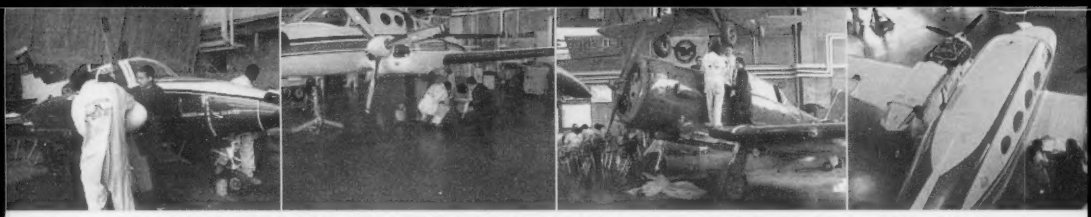
Although mechanics can earn A&P certification through a time-based experience requirement (18 months for a single rating or 30 months of concurrent experience for both), the most popular option is to graduate from a certificated part 147 Aviation Maintenance Technician (AMT) school. These schools, which are individually certificated as air agencies, are held to a strict set of standards outlined in their namesake—14 CFR part 147—that define everything from training materials and shop equipment to attendance and record-keeping. Currently there are 168 active part 147 schools in the United States that offer training in a variety of formats, including two- or four-year college degree programs or in a more concentrated 12- to 18-month format. A growing number of AMT schools have also become affiliated with high schools, offering teens a chance to get an early jump on their aviation careers.

"What was once a skill learned at a trade school has become a fast-paced career that offers exciting new potential."

The largest of its kind among high school part 147 programs is New York City's Aviation High School, which enrolls more than 2,000 students a year. Celebrating its 75th anniversary in June 2011, Aviation High School boasts having graduated more than 10 percent of all currently certificated aircraft mechanics.

"We offer our students a world-class training environment," says Aviation High School Assistant Principal Mario Cotumaccio, who contends that more innovative thinking is required among today's mechanics to keep pace with advancing aviation technologies. "Youngsters entering this field must understand that what was once a skill learned at a trade school has become a fast-paced career with exciting new potential."

Helping to embrace changes brought on by this paradigm shift in the maintenance community, AMT schools, such as Aviation High School and others, now incorporate more cutting-edge equipment and training aids in the classrooms. They



Students at New York City's Aviation High School perform a variety of maintenance tasks in preparation for an A&P certificate.

also provide access to internship programs that give students a chance to work in a real-world aviation maintenance environment.

Helping "Maintain" Success

In recent years, many industries have felt the pinch from a struggling global economy and the aircraft maintenance training industry is no exception. The number of A&P certificates issued by the FAA each year, which was 8,444 in 2005, has since declined more than six percent and has hovered around 7,900 over the last few years. Despite the challenges and unpredictable nature of the aircraft maintenance training industry, one constant for part 147 schools has been the supportive presence of the Aviation Technician Education Council (ATEC). Formed in 1961, ATEC's mission is to help part 147 schools meet their goal of producing qualified and capable mechanics. This responsibility includes advocating for AMT schools in the areas of curriculum improvement, technical and financial support, and promoting mutually beneficial relationships with government and industry groups.

"The landscape for aviation maintenance training has transitioned a great deal," says ATEC Government Relations Chair Andrew Smith, "that's why it's critical we remain actively engaged and committed to supporting the needs of 147 schools. They represent the foundation and the future of a healthy aviation maintenance industry."

ATEC has been actively involved with the FAA's Aviation Rulemaking Advisory Committee (ARAC), which was designed to review and recommend revisions to the 14 CFR part 147 training curriculum and operating requirements and received a record-number of recommendations. While the ARAC's recommendations are on hold as the FAA is attending to other safety-related rulemaking projects, the agency, according to FAA Airworthiness Safety Inspector and ARAC-member Ed Hall, will continue to pursue the ARAC's recommendations and provide updates on when the FAA will resume part 147 rulemaking.

Keeping the Blade Sharp

So, if you have the "aviation bug" and your idea of aviating is more in tune with using a multimeter and torque wrench than a headset and sectionals, perhaps aircraft maintenance training is for you. While the aviation maintenance industry is at a crossroads, the industry will no doubt continue to grow and evolve, especially with the rapid introduction of new technologies. But one thing that will not change is a need for quality training and education, which you are sure to find at an AMT school near you. Remember that aircraft maintenance training can also be a springboard for other career options, such as IA (Inspection Authorization), director of maintenance (DOM), aerospace engineer, or chief inspector. The sky is the limit, so what are you waiting for?

Tom Hoffmann is associate editor of FAA Safety Briefing. *He is a commercial pilot and holds a mechanic certificate with airframe and powerplant ratings, which he earned at Aviation High School in New York City.*

What is a Repairman Certificate?

Another option for the mechanically-minded is a repairman certificate. This certificate has less restrictive eligibility requirements, but has a much more narrow scope of privileges. Certificated repairmen can only perform maintenance within the scope of their training and specific job duties and be authorized to work under the employment of the repair station (or air carrier) through which they received certification. This means that your repairman certificate is not portable to different employers. One new development for repairmen came with the light-sport aircraft rule, which established a light-sport repairman certificate with two ratings: inspection and maintenance. For more information on repairman certificates, see 14 CFR part 65, subpart E.

For More Information

Aviation Technician Education Council (ATEC) Web site
http://www.atec-amt.org/

FAA search tool for part 147 AMT schools
http://av-info.faa.gov/MaintenanceSchool.asp

Basic Requirements to Become an Aircraft Mechanic
www.faa.gov/mechanics/become/basic/

SUSAN PARSON

Angle of Attack

Springing (Safely) Back into Action

In many parts of the country, it's been a tough winter. Airplanes lucky enough to live in a hangar spent most of the snowy season in bear-like hibernation, while ramp-dwelling aircraft shivered under repeated coatings of snow and ice. Such conditions usually leave avid pilots grinding their teeth over being grounded and thus eager to spring back into aviation action as soon as the first daffodil appears.

Sadly, our springtime eagerness to empty the ramps and fill the skies with our airplanes can lead to accidents when pilots and/or their aircraft are not properly prepared after a period of inactivity.

Preventing these accidents is one of the FAA's top priorities. As FAA Administrator Randy Babbitt recently said, our goal is to reduce the general aviation fatal accident rate to an unprecedented low level. To accomplish this reduction, the FAA has developed a focused 5-year transformation plan consisting of four overlapping elements. The first task is to work with the GA community to analyze available data and identify top accident causes. You might remember that we listed the top ten GA fatal accident causes in the Nov./Dec. 2010 issue of *FAA Safety Briefing*.

The remaining elements of the strategy include expanded focus on CFIs and flight training issues, safety promotion, and safety outreach. These elements describe the categories of tools and techniques that the FAA and the GA community will collaboratively develop to mitigate accident causes and contributing factors. Mel Cintron, manager of the FAA's General Aviation and Commercial Division, notes that two of the plan's core characteristics are especially important to its success. "We can do better by working *with* the GA community, and we can have an impact *without* making new rules," he says.

One example of non-regulatory action is a recent FAASTeam safety tip (NOTC2876) on the subject at hand, getting ready for the spring/summer flying season. The tip specifically focuses on runway safety practices, but it also stresses the overall importance of pilot preparation. An easy way to remember some of its suggestions is to remind yourself to BE AWARE:

- **B**rush up on rules, procedures, flying skills.
- **E** Expect to spend some time removing the winter "rust," reviewing such areas as:
- **A**ircraft preparation, especially after winter storage.
- **W**eather awareness—spring/summer weather includes thunderstorms!
- **A**viation environment, including airspace, airports, and ATC procedures.
- **R**isk factors, with emphasis on elements relevant to where and how you normally fly.
- **E**xternal pressures that might tempt you to fly or continue to fly when you shouldn't.

An easy way to get ready for spring/summer flying is to remind yourself to BE AWARE.

As Administrator Babbitt notes, "Aviation in our country has never been safer. Still, we can—we must—do better."

Susan Parson (susan.parson@faa.gov or @aviobrix for Twitter fans) is editor of FAA Safety Briefing *and a Special Assistant in the FAA's Flight Standards Service. She is an active general aviation pilot and flight instructor.*

Photo by Tom Hoffmann

JORGE R. CASTILLO

Vertically Speaking

General Aviation and the NextGen Partnership

The general aviation community has an important role in implementing the Next Generation Air Transportation System (NextGen). With the large number of GA aircraft, including helicopters, active in the National Airspace System (NAS), the success of NextGen will rely heavily on the ability of the FAA and the aviation community to develop affordable solutions and encourage GA operators to equip their aircraft early with NextGen technology.

It is also essential for the FAA to incorporate streamlined certification processes to accommodate the thousands of GA aircraft that will require certification of NextGen systems, such as Automatic Dependent Surveillance–Broadcast (ADS-B).

The FAA's Small Airplane and Rotorcraft directorates, which develop type certification policies and regulations, have begun reaching out to their respective stakeholders to identify the NextGen challenges the GA community faces. For example, earlier this year, the FAA met with the Aircraft Electronics Association (AEA) and HELI-EXPO® 2011 attendees to solicit feedback and identify their concerns. Armed with this information, the two directorates will work closely with the FAA's Aircraft Certification Service and NextGen teams to determine how best to address these challenges.

The helicopter community has already been closely involved with NextGen development. Helicopter operators engaged in petroleum and gas exploration played a crucial role in the successful implementation of ADS-B in the Gulf of Mexico. As a result of their participation and cooperation, the FAA now provides air traffic control services in an area of active airspace where surveillance was never before possible. This has led to more efficient operations in the Gulf of Mexico, fuel savings, and, most importantly, increased safety through improved situational awareness for both pilots and controllers.

However, the collaboration in the Gulf of Mexico's ADS-B program has shown that NextGen implementation will create both opportunities and challenges for helicopters (see chart below).

As the FAA and its aviation community partners work to transform the NAS from a radar-based air traffic control system to a satellite- and performance-based air traffic management system, the GA community may face additional challenges. Because of the diversity of missions that helicopter operators undertake, that community has some additional considerations. It is imperative for the FAA and the community to continue working together to ensure that NextGen includes this important segment of the aviation community. We encourage the helicopter community to provide its recommendations for addressing NextGen certification challenges. E-mail your ideas to Jorge Castillo at the FAA Rotorcraft Directorate, Jorge.R.Castillo@faa.gov or to Wes Ryan of the Small Airplane Directorate, Wes.Ryan@faa.gov.

Jorge R. Castillo is manager of the FAA Rotorcraft Directorate's Regulations and Policy Group. He has worked in the military and civilian aerospace industry since completing his engineering bachelor's degree in 1987.

How NextGen Capabilities Affect Helicopter Operations

Opportunities	Challenges
Localizer Performance with Vertical Guidance (LPV) provides ubiquitous vertical-guidance to provide access benefits and reduce Controlled Flight Into Terrain (CFIT) risks	GPS equipment manufacturers have not yet identified which equipment will need to be replaced by 2020 for compliance to the ADS-B Out rule
978 MHz Universal Access Transceivers (UAT) provide opportunity for improved safety through weather and traffic information on cockpit displays	Operators do not yet understand all of the tradeoffs when deciding whether to equip with 1090 MHz or UAT ADS-B Out
ADS-B Out will provide some expanded ATC services, including flight following at lower altitudes	Cost to equip aircraft with ADS-B Out prior to year 2020, which is when the ADS-B Out rule mandates this equipment

Flight Forum

Safety Article Reprints

I am the newsletter editor for our local EAA Chapter 95 and I was wondering if I could get permission to reprint some of your articles from your *FAA Safety Briefing*. I think there is a lot of good information in your magazine and would like to share it with members of our EAA chapter.

Jana Trofimchuck

Unless otherwise noted with a copyright indication, all of our articles are public domain and you are welcome to reprint them. We do ask that you reference FAA Safety Briefing *magazine as the source of the article, and send us a print or electronic copy of the publication where our material appears. It helps us to see which topics are most useful to various segments of the community. Thank you for helping us share the safety message.*

Shoulder Harness Field Approvals

Regarding the article "Small Cost, Big Benefit" (Jan./Feb. 2011) with respect to the installation of shoulder harnesses via field approval: In today's regulatory environment it's nearly impossible. The benefits of attempting to add safety by strict enforcement of unreasonably high installation standards pale in comparison to the added safety of actually installing something, like a shoulder harness. OVERALL safety will improve if more shoulder harnesses are installed; accepting the small risk of an improper installation is better than having fewer shoulder harnesses installed in older aircraft.

Ted Stanley, A&P/IA, ATP

We regret that you have experienced difficulties. The FAA's current guidance on shoulder harness installation is outlined in Policy Statement Number ACE-00-23.561-01. This guidance allows for shoulder harness retrofits on some older aircraft to be approved under a field approval or even a log book entry when the installation is not a major design change.

Advisory Circular 43.13-2B provides an example of an acceptable means of installing a shoulder harness that is eligible for field approval. There are also many manufacturers' service bulletins available for shoulder harness installations. Some require a field approval, but others require no further approval. Please check the available guidance. If your installation meets the requirements for field approval, it needs to be properly documented. The final responsibility for determining eligibility for field approval rests with the flight standards inspector, and solid documentation on whether the installation is eligible for field approvable can facilitate the inspector's review. If you cannot reach an agreement, the FSDO can request a major/minor design change determination from the local FAA Aircraft Certification Office through the coordinated field approval process.

Easier-to-Understand Weather Briefings

"In more than 50 percent of the VFR-into-IMC accidents we found in the NTSB files, the pilot *did* get a weather briefing" ("Cruise Control: Avoiding VFR into IMC" March/April 2011). Could weather related fatalities be reduced if weather briefings were given in English?

Neal White

Pilots who obtain weather via DUAT or DUATS do have the option of requesting a decoded version of the information. Thanks for your comment and for the opportunity to remind pilots of this option.

FAA Safety Briefing welcomes comments. We may edit letters for style and/or length. If we have more than one letter on a topic, we will select a representative letter to publish. Because of publishing schedule, responses may not appear for several issues. While we do not print anonymous letters, we will withhold names or send personal replies upon request. If you have a concern with an immediate FAA operational issue, contact your local Flight Standards District Office or air traffic facility. Send letters to: Editor, FAA Safety Briefing, AFS-805, 800 Independence Avenue, SW, Washington, DC 20591; FAX (202) 267-9463; or e-mail SafetyBriefing@faa.gov.

SUSAN PARSON

Postflight

What Not to Say

One of the guilty pleasures I indulge on business trips is watching TV shows I staunchly avoid at home. A common stop on the hotel remote control is TLC's *What Not to Wear,* a faux-reality show whose formula is to find a fashion disaster, use "secret video footage" to show her (it's always a woman) the error of her ways, and engineer a makeover that reveals the heretofore hidden glamazon within.

As I fly around my local airspace each weekend, I have often wished I could borrow the formula and create an aviation-themed show called "What Not to Say." I would secretly tape the radio disasters I hear and, like TLC's Stacy and Clinton, pounce upon the perpetrators with an offer to set them on the path to proper and professional-sounding pilot patter. Also like Stacy and Clinton, who provide their fashion protégées with "The Rules" for better sartorial selections, I would equip each audio offender with "The Rules" for proper aviation radio transmissions.

Think of your radio transmissions as being comparable to character-limited Tweets.

Learn the Lingo: Like a real language, Aviation-speak has its own peculiar grammar, syntax, diction, pace, and vocabulary. It even has a dictionary, the FAA Pilot/Controller Glossary (www.faa.gov/air_traffic/publications/atpubs/PCG/), which precisely defines the meaning and proper use of aviation terms. If you want to sound like a pro *on* the air when you are *in* the air, you need to become fluent—in fact, bilingual—in Aviation-speak. That means you listen, learn, and practice. I used cassette tapes (remember those?) to learn foreign languages, so it was natural to use audio aids to master Aviation-speak. I trained my ear by using an aviation-band radio to listen to a local TRACON frequency while I got ready for work. Until I felt comfortable speaking on the fly, I carried fill-in-the-blank scripts for each phase of flight.

Think Twitter, Not Blog: Brevity may be the soul of wit, but it is also the Prime Directive in Aviation-speak. If you're familiar with today's social media, you might find it helpful to think of your radio transmissions as being comparable to the 140-character limit for Tweets. We all know—and certainly we have all heard—pilots whose transmissions are more blog-worthy than Tweet-worthy. As you work to learn the lingo, practice writing what you might say and then make it a personal challenge to cut words to the absolute minimum. Nobody wants to slog through an audio blog.

It's Not CB Radio: Personal conversations do not belong on common frequencies. Though this rule seems like common sense and common courtesy, I am always astonished by how many pilots hog the frequency with chatter that is not germane to flight safety or operations. I have wondered how guilty pilots might react if I were to appear at the restaurant, car, or event they arranged in such detail on the party line.

Don't "Take the Active!" Please, please, please take heed of this one! Apart from the fact that your fellow fliers need you to leave (not "take") the runway, this phrase is the audio equivalent of tossing litter out the window. The point of radio transmissions, especially around non-towered airports, is to *communicate.* When a pilot is approaching an airport with intent to join the pattern and land, he or she is fervently listening for which runway is in use. Pilots who are "taking" or clearing "the active" clog the frequency without providing a shred of useful information. If you can't quite strike "the active" from your aviation vocabulary, at least append the runway number ... and strive to avoid being a secret audiotape target on "What Not to Say."

Susan Parson (susan.parson@faa.gov or @avi8rix for Twitter fans) is editor of FAA Safety Briefing *and a Special Assistant in the FAA's Flight Standards Service. She is an active general aviation pilot and flight instructor.*

ANNA ALLEN

FAA Faces

Gisele Mohler

Soaring Like a Bird Into the Next Generation of Flying

Gisele Mohler's interest in flying began 14 years ago when she met a GA pilot—a meeting that came to define her life. "We dated by going flying," says Mohler.

The flights became so frequent Mohler thought it would be a good idea to know how to land the plane. She received flying lessons as a Christmas gift from her pilot-friend, who soon became her husband. "I had one lesson and was hooked," she reminisces. "I never dreamed I'd be able to do something so adventurous and challenging."

After 12 hours of lessons she soloed. "It was so nice to be up there flying all by myself," says Mohler. She liked it so much that, upon obtaining her private pilot certificate, she decided to immediately pursue an instrument rating.

"My husband and I decided to get one together," says Mohler. This proved to be a good approach; while one received instruction, the other sat in the back seat and could observe how the details of the various tasks fit into the big picture.

Mohler's passion for flying led her to an FAA career. She started in air traffic in the Terminal Services unit at FAA's Washington, D.C. headquarters. She then moved to and later managed the Operational Evolution Partnership (OEP), an FAA program established to increase the capacity of the National Airspace System through the introduction of new runways and new air traffic management technology and procedures.

"The key to OEP's success was building relationships, both across the FAA and with the external aviation community," Mohler says. The OEP was so successful it morphed into the FAA's initial implementation planning model for the Next Generation Air Transportation System (NextGen), which Mohler spearheaded.

Mohler now leads the FAA's NextGen Implementation Performance & Reporting office. This newly established office provides oversight of NextGen implementation by developing performance metrics and managing the FAA's two NextGen governance boards. Mohler and her staff also work with the RTCA NextGen Advisory Committee (NAC), which consists of representatives from across the aviation community.

Mohler says the aviation community relationships she forged during her days in the OEP are essential. "When I was first building relationships and people heard that I'm a pilot, they immediately accepted me as one of them," Mohler muses. "It opened a lot of doors." Furthermore, her view of NextGen from both the pilot and regulator perspective provides valuable insight into its challenges and benefits. "Safety," says Mohler, "is the greatest NextGen benefit for GA."

Automatic Dependent Surveillance–Broadcast (ADS-B), for example, which provides weather information and enables pilots to see traffic equipped with ADS-B or transponders flying within a 15-mile radius on a display in the cockpit, "is going to increase safety for GA pilots exponentially," says Mohler.

Mohler lists Area Navigation (RNAV) using GPS and WAAS Localizer Performance with Vertical Guidance (LPV) approaches as beneficial to GA pilots since they provide access to airports and runways that may otherwise be off limits during IMC conditions.

"Safety is the greatest NextGen benefit for GA."

"To prepare for NextGen, it is important that GA pilots know what changes are coming," says Mohler. The FAA's NextGen Web site (www.faa.gov/nextgen), where you can download the NextGen Implementation Plan, is a good source of information. "Pilots should think about where and how they want to fly, and equip accordingly."

Deciding on whether to equip with ADS-B In or WAAS is something that Mohler herself is considering. She and her husband fly a Piper *Comanche 260B*. But, Mohler's recently purchased 1956 Piper *Tri Pacer* reinvigorated her passion for flying. As opposed to the heavier *Comanche*, she says, this smaller and lighter airplane provides much more flying flexibility and fun.

"With the *Tri Pacer*, if I see a CAVU sky, I hurry home, hop in the plane and fly," says Mohler. "It makes me feel free, like a bird."

Anna Allen is associate editor of FAA Safety Briefing.

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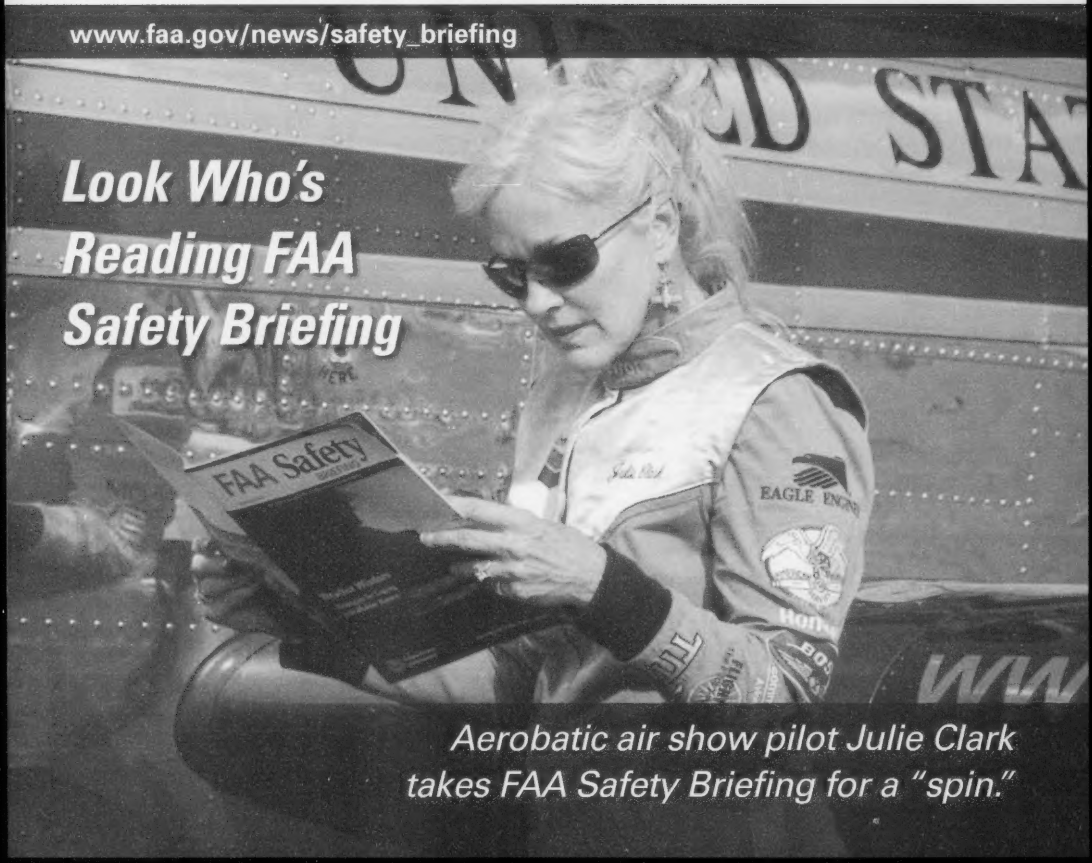

Aerobatic air show pilot Julie Clark takes FAA Safety Briefing for a "spin."